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# Mexico

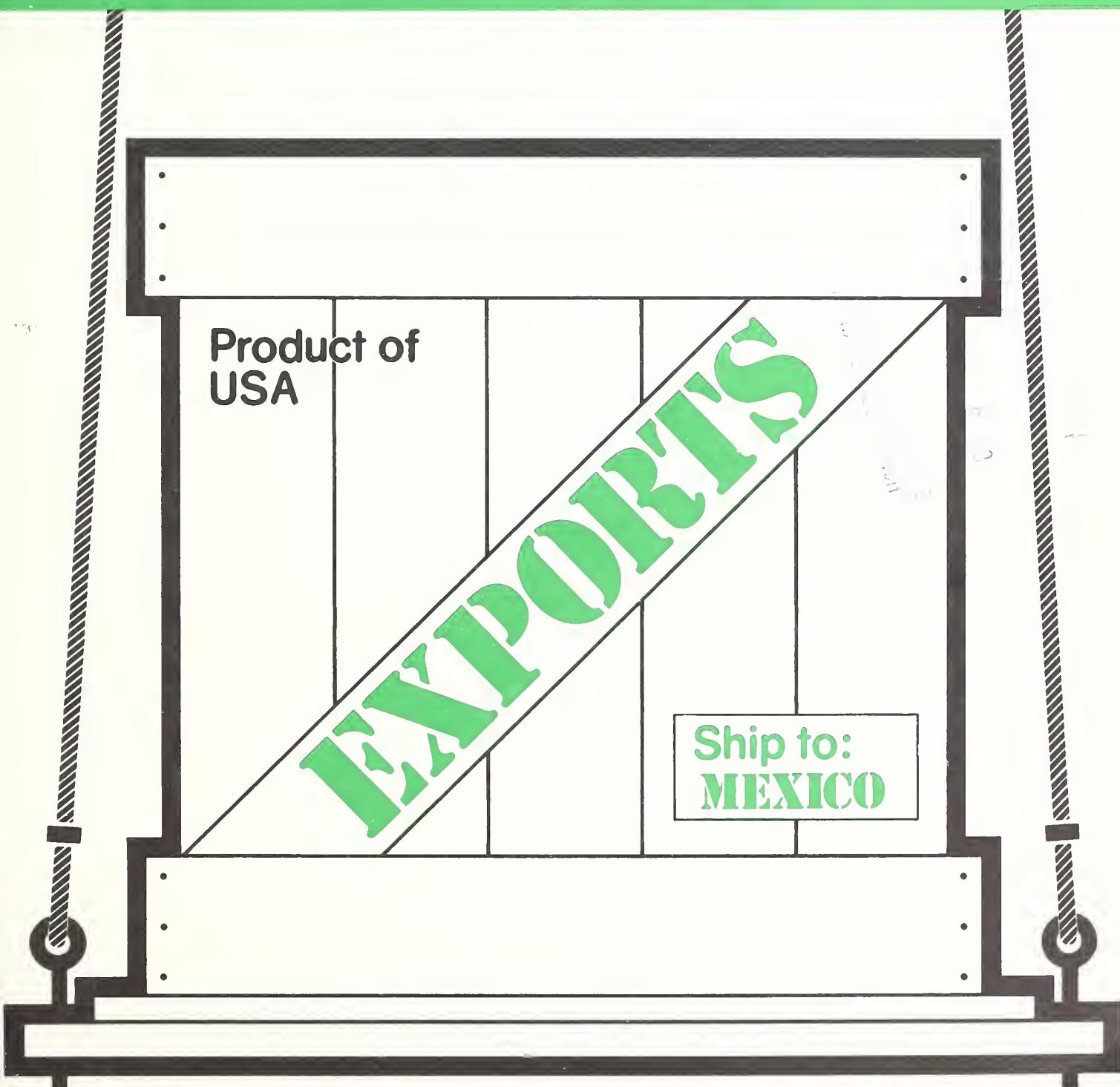
## An Export Market Profile

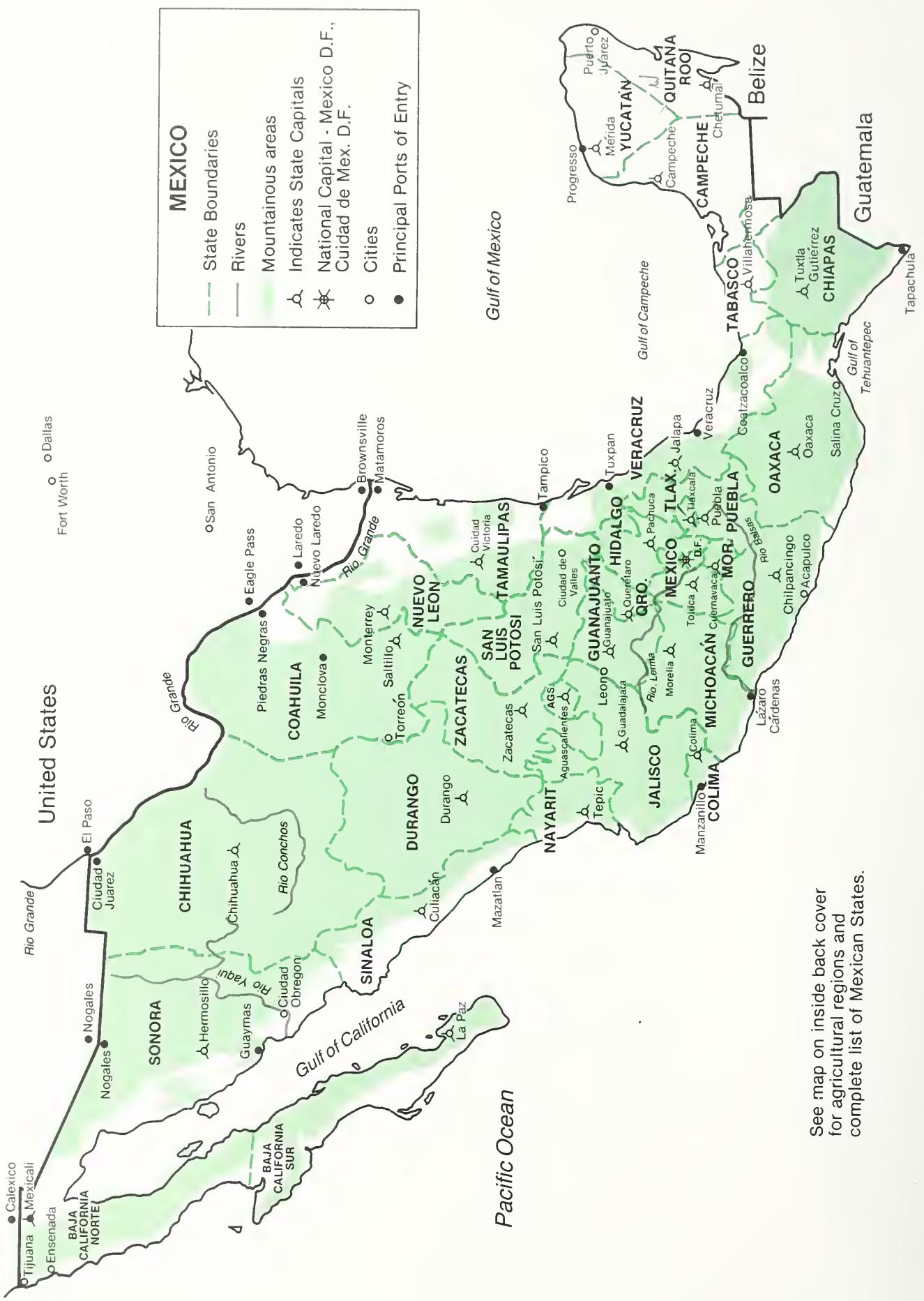
Donna H. Roberts  
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See map on inside back cover  
for agricultural regions and  
complete list of Mexican States.

MEXICO: An Export Market Profile. By Donna H. Roberts and Myles J. Mielke. International Economics Division, Economic Research Service, U.S. Department of Agriculture. Foreign Agricultural Economic Report No. 220.

## ABSTRACT

Mexico will likely remain one of the top 10 markets for U.S. agricultural products through 1990, although its recent financial difficulties will reduce its imports of nonbasic commodities in the next few years. Its steadily expanding population and highly variable weather will underpin expected increases of imports of grains and oilseeds. The United States is expected to retain its present position as the dominant supplier of Mexico's agricultural imports because of the two countries' close trading relationships and well-established marketing channels. Economic recovery in the late eighties will largely determine the size and composition of Mexico's agricultural import bill.

Keywords: Mexico, farm production policies, farm consumption policies, agricultural trade policies, market shares, import projections.

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## PREFACE

Expanding the markets for U.S. agricultural exports is a major goal of the U.S. Department of Agriculture (USDA). In support of this goal, the Economic Research Service (ERS), in cooperation with the Foreign Agricultural Service (FAS), is preparing export profiles for a number of high-potential markets for U.S. agricultural products. ERS is USDA's major source of agricultural and trade information on foreign countries and regions, while FAS has the key role in helping United States increase its agricultural exports in world markets. Similar profiles have been or will be prepared for selected markets in Africa and the Middle East, Asia, and Latin America. See list of titles available elsewhere in this publication.

This report presents information and analysis on the prospects for U.S. agricultural exports to Mexico. The study surveys the basic factors underlying agricultural supply and demand in Mexico and presents longrun projections of food and agricultural trade.

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## ABBREVIATIONS

*Spanish*

<i>Abbreviation</i>	<i>Spanish Name</i>	<i>English Name</i>
ANAGSA	Aseguradora Nacional Agricola y Ganadera, S.A.	National Crop and Livestock Insurance Company
ANDSA	Almacenes Nacionales de Deposito, S.A.	National Storage and Deposit Company
BANAMEX	Banco Nacional de Mexico	National Bank of Mexico
BANRURAL	Banco Nacional de Credito Rural	National Rural Credit Bank
BORUCONSA	Bodegas Rurales de CONASUPO, S.A.	Rural Storage Company of CONASUPO
CECONCA	Centros de CONASUPO de Capacitacion	CONASUPO Training Centers
CIMMYT	Centro Internacional de Mejoramiento de Maiz y Trigo	International Center for the Improvement of Corn and Wheat
CONASUPERS	Supermercados de CONASUPO, S.A.	CONASUPO Retail Outlets
CONASUPO	Compania Nacional de Subsistencias Populares, S.A.	National Popular Subsistence Company
CORDIMEX	Corderia Mexicana	National Sisal Company
DGEA	Direccion General de Economia Agricola	Directorate General for the Agricultural Economy
DICONSA	Distribuidores CONASUPO, S.A.	CONASUPO Distributors
FERTIMEX	Fertilizantes Mexicanos, S.A.	Mexican Fertilizer Company
FIRA	Fondos Instituidos en Relacion a la Agricultura	Funds Instituted for Agriculture (National Bank of Mexico)
ICONSA	Industrias CONASUPO, S.A.	CONASUPO Industries
INMECAFE	Instituto Mexicano de Cafe	Mexican Coffee Institute
INIA	Instituto Nacional de Investigaciones Agricolas	National Institute of Agricultural Research
LICONSA	Leche Industrializado de CONASUPO, S.A.	Milk Industry of CONASUPO
MICONSA	Maiz Industrializado CONASUPO, S.A.	Corn Industry of CONASUPO
PEMEX	Petroleos Mexicanos	Mexican Petroleum Company

*Spanish- Continued*

PRONAL	Programa Nacional de Alimentacion	National Food Program
SAM	Sistema Alimentario Mexicano	Mexican Food System
SARH	Secretaria de Agricultura y Recursos Hidraulicos	Secretariat of Agriculture and Water Resources
SECOFIN	Secretaria de Comercio y Fomento Industrial	Secretariat of Commerce and Industrial Development
SPP	Secretaria de Programacion y Presupuesto	Secretariat of Program and Budgeting
TRICONSA	Trigos Industrializados de CONASUPO, S.A.	Wheat Industry of CONASUPO

*English*

CPI	Consumer Price Index
FAO	Food and Agriculture Organization of the United Nations
GDP	Gross Domestic Product
GOM	Government of Mexico
GSM-102	Export credit guarantee program, Office of the General Sales Manager (USDA)
IMF	International Monetary Fund
LAIA	Latin American Integration Association
LAFTA	Latin American Free Trade Association
USDA	U.S. Department of Agriculture

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Conversion Chart

This report uses metric units throughout.

1 metric ton (mt)	= 2,204.62 pounds.
1 hectare (ha)	= 2.471 acres
1 U.S. dollar	= 310 pesos ("market" rate, 1985 average)
	= 257 pesos ("controlled" rate, 1985 average)

## SUMMARY

Mexico's discovery and exploitation of its huge oil reserves, together with one of the highest population growth rates in the world, led to a strong upsurge in food demand in the seventies. A net grains exporter in 1980, Mexico began to rely more on external supplies to provide needed food and feedstuffs.

The United States will continue to be the primary agricultural exporter to Mexico through the eighties because of longstanding trade relationships and well-established marketing channels. Mexico has been among the top three markets for U.S. agricultural commodities in the early eighties, purchasing an average of \$2 billion per year. Mexico typically imports 80-90 percent of its imported agricultural commodities from the United States.

Basic commodities, such as corn, dry beans, sorghum, wheat, soybeans, sunflower seed, and nonfat dry milk, make up the bulk of Mexico's imports. The United States supplies nearly all of these commodities except for nonfat dry milk. Mexico's purchases of other U.S. commodities totaled nearly \$1 billion at the beginning of this decade but have recently slowed because of reduced purchasing power and scarce foreign exchange, the result of the 1982 financial crisis of deficit spending, falling oil prices, and rising interest rates.

Because of Mexico's continued rapid population growth, its high proportion of unproductive land, its rigid land tenure system, and its highly variable weather, Mexican imports of basic commodities will continue to grow through the midnineties. Mexico is attempting to diversify its foreign suppliers, but in its present financial difficulties, U.S. products are attractive because of the generous credit arrangements extended to Mexico. Those credit guarantees were an effective tool for substantial U.S. exports of grains and oilseeds to Mexico.

The potential for expanded sales of livestock, horticultural, and processed commodities to Mexico is not immediately promising. Growth is expected to resume in the late eighties.

# Mexico

## An Export Market Profile

Donna H. Roberts  
Myles J. Mielke

### INTRODUCTION

The present shortcomings of the Mexican economy and its farm sector might cause one to overlook the remarkable economic achievements of the country since World War II, achievements with few parallels in the world. Mexico's farm sector grew by more than 6 percent per year from 1950-75, following an import substitution strategy of development that many newly industrializing countries also pursued. The Mexican farm sector demonstrated a capacity to meet the demands of an expanding population while generating a large proportion of the foreign exchange needed to pay for the import of materials for industrial expansion. As the opportunity for import substitution diminished in the early seventies, Mexico faced the problem of devising an appropriate growth strategy.

At this point, the Government increased spending, which, rather than stimulating sustained growth, led to inflation, the loss of foreign exchange, and (in 1976) the first devaluation of the peso in 22 years. The need for a solution to those problems was nearly obscured by the discovery of Mexico's enormous oil reserves. When the Organization of Petroleum Exporting Countries (OPEC) quadrupled the world price of oil in 1973, Mexico was still a net oil importer. By 1975, Mexico had begun exporting modest amounts of petroleum; by 1982, it was the world's fourth largest producer, exporting more than

1.5 million barrels a day. Revenue from petroleum exports and petroleum products reached \$16.6 billion in 1982.

The Portillo administration, which assumed office in 1976, embarked upon an ambitious plan to turn Mexico's nonrenewable oil resources into sustained industrial growth. Paradoxically, Mexico's huge oil reserves contributed significantly to the severity of its economic difficulties. Inflation beset the economy when federal spending exploded, spurring a massive outflow of capital. A crisis followed when the Government continued to pursue its ambitious development plan in an environment of falling oil prices and rising interest rates, borrowing heavily in the short-term credit markets to finance its operations. More than two-thirds of Mexico's oil revenues were needed to pay the interest on its outstanding debt in 1982. Mexico owed over \$94 billion to foreign lenders by the end of 1984, second among the world's developing nations in the size of its external debt.

As the seventies ended, many distortions that accompany late industrialization in a populous rural society began to demand the attention of Mexican officials. These distortions included highly skewed income distribution, rapid population growth, urbanization, malnutrition, and inadequate services for the segment of the population that did not benefit from the Mexican economic boom. Furthermore, in 1979 Mexico's worst drought in more than a decade focused attention on the agricultural sector, which had been neglected during the oil boom. During the seventies, Mexico began to import ever-increasing amounts of basic agricultural commodities as demand, underpinned by a rapidly growing population made prosperous by the direct or indirect effects of the petroleum boom, and economic

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growth outstripped the output of the agricultural sector in which growth had slowed from "a glorious gallop to a temperate trot" [71]. 1/

The rate of expansion of Mexico's irrigation districts began to slow dramatically. No new technology emerged to succeed that of the Green Revolution, and domestic terms of trade continued to favor other sectors in the economy. The policy debate in the seventies centered on whether the Government should commit enormous resources to raise living standards and move toward food self-sufficiency, or rely more on domestic and international market forces to solve the food supply problem. When it became clear that Mexico would have to import nearly 10 million tons of basic grains in 1980 in the wake of the drought, the Government moved in the direction of the first option.

In March 1980, Jose Lopez Portillo, president of Mexico, postponed Mexico's entry into the General Agreement on Tariffs and Trade (GATT) and introduced the Sistema Alimentario Mexicano (SAM), or the Mexican Food System. The goal of the program, launched before Mexico's financial crisis developed, was to achieve food self-sufficiency in a way that would improve income distribution without damaging Mexico's agricultural export capacity. The SAM was to be the principal means of using oil revenues to create an enduring productive base to serve the whole nation and to cure many of its social ills. The irony associated with the SAM was that it set out to attain food self-sufficiency and to raise living standards, but instead contributed to economic overheating during the oil bonanza, lower living standards (because of runaway inflation and the subsequent austerity program), and greater food dependency, at least in the short run [1].

Because of the financial crisis, Mexico was forced to favor countries that offered financing along with their commodities, thereby restricting access to the Mexican market for traditional suppliers like Brazil and

Argentina. The United States benefited most from Mexico's increased reliance on imported agricultural products. Before Mexico's financial woes, the two countries' shared border had fostered established marketing channels, and the competitive price and quality of U.S. feed grains and oilseeds prompted Mexico to turn to the U.S. market for most of its food and feed imports. Immediately following Mexico's financial crisis in 1982, the United States dominated the Mexican market with the help of USDA credit guarantees offered under the GSM-102 program.

The recent boom-and-bust cycle highlighted the dual nature of the Mexican market. Mexico's agricultural imports from the United States were valued at \$2.4 billion in both 1980 and 1981. During both years, the total was split almost equally between Government purchases of basic commodities (mostly grains and oilseeds) necessitated by the disappointing 1979 and 1980 harvests, and private imports of many high-valued products, which were purchased with an overvalued peso. In 1982, the value of U.S. agricultural exports to Mexico fell by more than 50 percent because of Mexico's record-breaking harvest and three devaluations, which, compared with the dollar, diminished the peso's purchasing power by nearly 75 percent. Although private sector purchases declined in 1983 and 1984 to but a fraction of previous levels, Mexico imported an average of \$2 billion of U.S. farm goods during these years because of large Government purchases of grains and oilseeds.

In an environment of rapid inflation and unsettled international economics, a reliable forecast of key economic variables is difficult. Among the major debtor countries, Mexico was considered to be the most successful in resolving its debt-servicing dilemma and reactivating its economy. Nonetheless, private sector purchases of minor commodities will not likely strengthen in the near future, given the austerity measures and foreign exchange constraints currently in place. By 1992, high-valued agricultural products could show the greatest potential for relative import growth. This forecast presumes that once the economy resumes its growth, Mexican consumers will resume purchasing products not available domestically.

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1/ Italicized numbers in brackets are cited in the References section at the end of this report.

The course of Mexico's demand for major agricultural commodities will likely differ from the patterns during the seventies. First, the growth in animal protein consumption probably will slacken considerably over the first half of the eighties. Barring a drought, Mexico should be able to produce a larger proportion of its feed needs than in the previous decade, when rapidly expanding meat consumption necessitated larger sorghum and oilseed imports. Per capita human consumption of corn, dry beans, wheat, rice, and vegetable oil will probably grow less rapidly than in the seventies, given the Government's inability to maintain the large consumer subsidies established over the past decade. Total consumption will still expand significantly, however, primarily because of Mexico's rapid population growth. The anticipated recovery in the economy over the second half of the eighties will also contribute to the estimated growth in the total demand for agricultural products.

Production, too, will vary from the trends observed over the past decade. Growth of Mexican livestock output may slow substantially from the 7-percent annual rate of the seventies because of dampened demand and the high cost of imported inputs. By extension, the rate of growth of feed grain production, which expanded exponentially in the early and midseventies, will likely falter. Reinvigoration of these two sectors will depend on Government initiatives once Mexico regains its economic balance. Food grain production will probably grow only moderately during the eighties, with the prospects for significant farmland expansion diminished by the increasing costs of bringing marginal land into production. No significant gains in grain or oilseed yields are expected. The central feature of Mexico's crop production is its volatility; production of individual crops fell by as much as 60 percent in some drought years over the past decade. Because a drought occurs in about 4 out of every 10 years in Mexico, fluctuating production patterns will likely persist through the eighties.

The gap between domestic production and consumption of all major agricultural commodities will probably widen during the eighties. Corn, Mexico's most important food grain, will continue to be the largest source of absolute growth in U.S. agricultural exports to

Mexico. Growth in U.S. exports of sorghum, oilscdcs, and oilsccd products to Mexico will depend on competition from other suppliers, principally Argentina and Brazil. The potential for larger U.S. shipments of higher valued livestock products is good for the late eighties. U.S. producers of both major and minor commodities will have to remain alert to take advantage of opportunities presented by the large year-to-year fluctuations in the Mexican market, which will be determined by weather, shifting exchange rates, and changing trade policies.

## MEXICO'S DEMAND FOR AGRICULTURAL PRODUCTS

Until Mexico's financial difficulties began in 1982, changing demographics, combined with a rapidly expanding economy and increases in real incomes for a large segment of the population, led to changes in the variety, quality, and quantity of food demanded. Mexico's agricultural sector was unable to satisfy these demands, and food imports increased substantially. This surge in import demand for food and other products was made possible by the rapid rise in the value of Mexico's petroleum exports. But world oil prices began to fall in the early eighties at the same time that interest rates began to peak, forcing Mexico to impose stringent austerity measures and foreign exchange controls to fulfill external financial commitments. Imports of all nonbasic food items have been severely restricted since 1982, but Mexico's demand for basic commodities, underpinned by population growth, continues to outstrip Mexico's domestic production capabilities.

### Population

Mexico's population rose by an average 3 percent per year over the past three decades, reaching an estimated 68 million in 1980 (table 1). During the fifties and most of the sixties, the population growth rate tended to accelerate as the mortality rate declined (table 2). Birth rates have declined because of public family planning programs; but of the 20 most populous countries in the world, none had population growth rates as high as Mexico's (ranked 11th) during the seventies. Although a population explosion is not uncommon for developing nations, the duration and

magnitude of Mexico's population growth is unique [34]. Mexico's population will probably exceed 100 million by the year 2000.

Mexico's median age has declined to the point that 43 percent of the population was less than 15 years old in 1980. The annual growth in the labor force is expected to remain close to 4 percent throughout the eighties. Employing the emerging youthful labor force will be one of the major challenges for the Mexican Government.

A significant rural-to-urban migration pattern has reflected greater urban employment and income possibilities (table 1). The

Government supported this pattern by maintaining consumption policies that favored urban dwellers, sometimes at the expense of rural producers. Three of 10 people lived in cities in 1950; that ratio rose to 6 of 10 by 1980. Mexico City, the capital and largest city in Mexico, has approximately 17 million inhabitants, nearly one-fifth of the total population.

Mexico's farmers will probably be unable to meet the growth in demand for food resulting from population increases and rural-urban migration. Mexico's land/inhabitant ratio is 68 acres compared with 106 for the United States. More important, however, is that the United States has 21 acres of arable land per person while Mexico has only 7 [71].

Table 1--Population and urbanization, 1930-80

Item	1930	1940	1950	1960	1970	1980
<u>Million</u>						
Population	16.6	19.6	25.8	35.0	49.4	67.8
<u>Percent</u>						
Urban <sup>1/</sup>	19.8	21.9	28.9	39.3	48.6	60.2
Rural	80.2	78.1	71.1	60.7	51.4	39.8

1/ Localities of 10,000 or more persons.

Source: [25].

### Domestic Economy

The economic growth of Mexico was rapid and remarkably steady from World War II until the early seventies. Growth in Mexico's real gross domestic product (GDP) averaged more than 6.4 percent per year from 1970-75, twice the percentage increase in the population (table 2).

National income reached 9,417 trillion pesos (undeflated) in 1982, the equivalent of US\$171.3 billion [70]. According to World

Table 2--Income and population growth, 1970-83

Year	Gross domestic product		Real per capita disposable income		Population	
	1970 pesos	Change	1970 pesos	Change	Number	Change
	Billion	Percent	Billion	Percent	Thousands	Percent
1950	117.6	NA	NA	NA	25,800	1/2.75
1960	212.6	1/6.1	NA	NA	34,990	1/3.51
1970	444.3	1/7.6	7,723	NA	49,357	1/3.50
1971	462.8	4.2	7,746	0.3	51,060	3.45
1972	502.1	8.5	8,120	4.8	52,796	3.40
1973	544.3	8.4	8,528	5.0	54,565	3.35
1974	577.6	6.1	8,754	2.6	56,366	3.30
1975	609.9	5.6	8,921	1.9	58,198	3.25
1976	635.8	4.2	9,063	1.6	60,060	3.20
1977	657.7	3.4	9,066	.3	61,952	3.15
1978	711.9	8.2	9,446	4.2	63,873	3.10
1979	777.2	9.1	10,070	6.6	65,821	3.05
1980	841.9	8.3	10,670	5.9	67,796	3.00
1981	908.8	7.9	11,141	4.4	69,762	2.90
1982	903.8	-.5	NA	NA	71,715	2.80
1983	856.2	-5.3	NA	NA	73,652	2.70

NA = not available.

1/ 10-year average growth rates.

Sources: [16, 28].

Bank statistics, Mexico's 1982 GDP ranked 10th in the world (excluding centrally planned, nonmarket industrial countries), ahead of Australia (US\$164 billion) and behind Spain (US\$181 billion). In 1982, Mexico's GDP equaled approximately 5.7 percent of the U.S. GDP of US\$3,010 billion. Within Latin America, Mexico's GDP is exceeded only by Brazil's.

Growth slowed in the midseventies when the Government's expansionary fiscal policy generated soaring public sector debt, large current account deficits, rapid price inflation, capital flight, and the first devaluation of the peso (1976) in 22 years. The need for solutions was almost immediately obscured by the discovery of Mexico's enormous oil reserves. The value of crude petroleum exports doubled each year from 1977 through 1980, peaking at \$15.6 billion in 1982. Relying on that and an inflow of foreign investment and external loans, Mexico embarked upon an ambitious development plan that featured huge increases in public expenditures. Several factors converged in 1982 to squash the rapid economic growth: oil prices declined, interest rates rose, a significant amount of Mexico's outstanding short-term credit came due, and the Government was forced to devalue the peso three times in 8 months. The economy registered virtually no growth in 1982 and actually contracted by 5.3 percent in 1983.

The pattern of growth in real per capita disposable income roughly paralleled the growth registered by the economy as a whole. Given the lackluster performance of the domestic agricultural sector during the seventies, increased agricultural imports accompanied periods of rapid per capita income growth. After large jumps in real disposable income during 1972-73, Mexico became a net importer rather than a net exporter of grain (principally corn and wheat) for the first time since the adoption of Green Revolution technology in the midsixties. The demand for agricultural products soared once again during 1978-81 when the average increase in per capita incomes rose by more than 4.5 percent annually.

The increase in real income also triggered a demand for nontraditional food. Mexico's growing middle class increased its consumption of livestock products such that a

large component of Mexico's agricultural import bill was feedstuffs. As the economy slowed, however, the consumption of nonbasic foods plummeted because consumers switched from higher priced livestock products and imported foods to a more traditional diet based on basic grains and other unprocessed foods.

The rewards of Mexico's economic boom in the seventies were not as equitably distributed as in some other rapidly developing semi-industrialized countries, such as Taiwan. In fact, within the Western Hemisphere only in Honduras, Peru, and Brazil do the poorest 40 percent of the population receive a smaller share of income than in Mexico [11]. The middle 60 percent of all Mexican households' share of personal disposable income, however, rose from 38.3 percent in 1963 to 41.6 percent in 1977 (table 3). Mexico City accounted for about 20 percent of all Mexican households and slightly more than 35 percent of total household income.

As in any dynamic economy, Mexico has undergone major structural changes. The evolution of the Mexican economy has been strongly influenced by direct Government involvement. Although Mexico's agricultural output expanded, rapid industrialization has spurred economic growth since 1950. Between 1950 and 1980, industry's share of GDP rose from 27 to 40 percent, while agriculture's share fell from 19 to 8 percent (table 4). Agricultural output grew by an annual average of 2.5 percent during this period, well below

Table 3--Family income distribution in Mexico by income decile, 1963, 1968, 1977

Income decile	1963	1968	1977
	Percent of total disposable income		
I (bottom 10%)	1.69	1.21	1.08
II (11-20%)	1.97	2.21	2.21
III (21-30%)	3.42	3.04	3.23
IV (31-40%)	3.42	4.23	4.42
V (41-50%)	5.14	5.07	5.73
VI (51-60%)	6.08	6.46	7.15
VII (61-70%)	7.85	8.28	9.11
VIII (71-80%)	12.38	11.39	11.98
IX (81-90%)	16.45	16.06	17.09
X (top 10%)	41.60	42.05	37.99

Source: [26].

Table 4--Contributions to Mexico's GDP by sector (1960 pesos)

Item	1950	1960	1970	1980	Average annual rate of change			
					1950-65	1960-70	1965-80	1970-80
Billion pesos					Percent			
Total GDP	83.3	150.5	296.6	512.1	6.4	6.4	6.1	5.6
Agriculture <sup>1/</sup>	16.0	24.0	34.5	43.5	4.3	3.7	2.5	2.4
Industries	22.1	43.9	102.2	206.0	7.6	7.1	7.8	7.3
Services <sup>2/</sup>	45.8	84.1	163.5	274.1	6.5	6.2	5.8	5.3
Percent								
Agriculture's share of GDP	19.2	15.9	11.6	8.4	na	na	na	na

na = not applicable.

<sup>1/</sup> Includes crops, livestock, forestry, and fisheries.<sup>2/</sup> Includes Government expenditures.

Source: [28].

the 3.3-percent population growth rate. The importance of Mexico's primary sector measured in terms of its labor force has also diminished. Thirty-two percent of the economically active population was employed in agriculture in 1980, compared with 58 percent in 1950 [28]. One clue to this decline in the agricultural sector's importance lies in the fact that agricultural prices grew more slowly than prices in manufacturing, construction, and commerce for the past 30 years (table 5).

Since the midseventies, Mexico's energy industry has contributed to the economy's expansion and its instability. Petroleum, coal, and electricity accounted for about 8 percent of Mexico's GDP in 1980, compared with about 4 percent in 1970 [28]. This number understates the energy subsector's importance, however. The large growth in Government services, public investment, and external borrowing, which determined the velocity and direction of economic growth

since 1977, was tied to actual and anticipated petroleum revenues.

#### Balance of Payments

Mexico's economic difficulties are most vividly reflected in its current balance-of-payment problems. The trade balance, despite the oil earnings, progressively worsened until the 1982 financial crisis. The Government's policy of maintaining an overvalued peso contributed most to the deteriorating trade balance. The nominal peso-dollar exchange rate remained virtually unchanged during 1977-81 despite a domestic inflation rate considerably above that of the United States, Mexico's major trading partner (table 6). The significant appreciation of the real exchange rate over this period also accounted for the decline in the competitiveness of Mexico's nonpetroleum exports.

As revenues from petroleum exports began to grow during the late seventies, the Government decided to use oil as a lever for more borrowing to pay for expanding public investment and other expenditures. This rapid growth strategy worked for a few years, but it could continue to be successful only if the price of oil kept rising. When oil prices leveled off in 1980, the rising trade deficit accompanied rapidly rising interest rate payments on the accumulated external debt, most of which had been contracted on a short-term, variable rate basis. By 1981, the current account deficit had increased by nearly 74 percent over the 1980 deficit, while

Table 5--Mexican price index, 1950-80

Item	1950	1960	1970	1980	1950=100			
					1950-65	1960-70	1965-80	1970-80
Manufacturing	100.0	183.8	235.3	1,076.6				
Construction	100.0	226.2	323.8	1,925.7				
Commerce	100.0	201.6	263.3	1,272.1				
Agriculture	100.0	171.0	222.8	1,056.6				
Crops	100.0	162.5	212.2	1,053.7				
Livestock	100.0	184.8	238.4	1,060.7				

Source: [49].

large amortization payments became due (table 7). Anticipating the strains in the balance of payments, many Mexicans lost confidence in the peso and began to export capital as they had in 1976. More important, however, foreign banks that had previously adopted an indulgent attitude toward their Mexican loans began demanding payment.

Table 6--Mexico's consumer price index and exchange rates, 1970-83

Year	Yearly change in CPI 1/	Nominal rate of exchange 2/
	Percent	Pesos/dollar
1970	5.3	12.5
1971	4.5	12.5
1972	5.8	12.5
1973	21.3	12.5
1974	20.5	12.5
1975	11.6	12.5
1976	27.1	20.2
1977	20.6	22.7
1978	16.7	22.7
1979	20.0	22.8
1980	29.8	23.2
1981	28.7	26.0
1982	98.9	3/100.4
1983	81.8	3/159.3

1/ December to December changes.

2/ Rates of exchange are as of December of each year.

3/ The pesos/dollar ratio is for the free market rate. The Government-controlled rate for 1982 and 1983 was 67.1 and 142.0 pesos per dollar, respectively.

Source: [2].

By the beginning of 1982, the crisis was imminent. Interest rates continued to rise as oil glutted the world market. The more Mexico's borrowing requirements intensified, the more its creditworthiness deteriorated. By February, the Government no longer had sufficient foreign exchange reserves to support the peso and its value dropped from 25 to 45 pesos to the dollar. Over the next 6 months, the Government tried to regain control of the economy through public expenditure cuts, exchange controls, further devaluations, and eventually nationalization of commercial banks. Nevertheless, external debt rose to more than \$80 billion, more than any other developing country except Brazil. In August 1982, Mexico notified foreign banks that it could no longer service its debt. Interest payments alone consumed more than two-thirds of Mexico's petroleum export revenues (table 8). With the support of the international financial community, Mexico began to restabilize its balance-of-payments accounts in late 1982.

To reduce the need for foreign financing, the Government cut the public sector deficit from over 18 percent of GDP in 1982 to 8.5 percent in 1983. The Government planned to reduce this ratio still further in 1985 to 3.5 percent of GDP. Imports fell by more than 40 percent in 1983, due mostly to the sharply devalued peso and the Government's rigorous import licensing requirements. As a result, Mexico's

Table 7—Mexico's balance-of-payments summary

Item	1970	1975	1980	1981	Million dollars	
					1982	1983
Current account balance	-1,188	-4,443	-7,223	-12,544	-4,878	5,546
Total exports	3,117	6,793	23,606	29,079	27,258	26,842
Petroleum exports 1/	0	439	9,449	13,305	15,623	14,821
Total imports	3,882	9,910	26,206	34,364	21,820	12,673
Public sector interest payments	290	1,032	3,958	5,476	8,400	7,346
Direct foreign investment (private, net)	185	204	1,254	1,189	709	309
Capital account	849	5,459	11,948	21,860	8,631	-853
Change in reserves (minus sign = increase)	-102	-165	-1,151	-1,012	3,185	-3,106

1/ Crude exports only.

Sources: [2, 4].

trade surplus reached the unprecedented level of \$14 billion. The Government raised some taxes (notably its value-added tax) and doubled domestic prices for oil and gas.

The attendant economic and social costs of this stabilization program are enormous and will no doubt be felt for several years. For the first time in 40 years, real growth in Mexico's GDP declined in 1983 from the previous year. Unemployment estimates are generally unreliable, but are suspected to have risen at least as much as the labor force has grown over the past 2 years, about 8 percent. Further increases in unemployment were averted by a substantial decline in real wages. The minimum wage increased by 45 percent in 1983, while the cost of living rose by more than twice as much.

Mexico's present economic situation can only be described as fluid. The inflation rate still hovers near 50 percent, and industry remains weakened by the combination of the world economic recession and privately incurred dollar debts. Nonetheless, Mexico is the most successful of the major Latin American debtor countries in resolving its debt-rescheduling dilemma and reactivating its economy. After 3 years of cuts in imports and public sector expenditures, the Mexican economy expanded modestly in 1984. Oil will dominate Mexico's economic scene through the eighties, which

will produce mixed consequences for the economy.

## MEXICO AS A MARKET FOR AGRICULTURAL PRODUCTS

Mexico has rapidly assumed an important role in the U.S. and world economies. Mexico's annual population growth rate is estimated at just under 3 percent with a population of 76-77 million people in 1985. In a country with few natural resources but perhaps the world's fourth largest oil reserves, Mexico's expanding population has produced demands beyond the productive capacity of the country. Yet, oil has yielded the wealth to pay for those needs.

### Agricultural Trade

Once a major agricultural exporter, Mexico's agricultural production failed to keep pace with the growing demand of its population; the country has relied on imported products to meet its food and feed needs for nearly a decade. The value of agricultural exports more than tripled from 1970-80, but the sector's relative importance as a foreign exchange earner declined significantly during this period, even excluding petroleum exports (tables 9 and 10). Coffee ranks as Mexico's second most important export product (after crude oil), followed by cotton, tomatoes, other fresh vegetables and fruit, and live cattle.

Agricultural imports accounted for 17 percent of total merchandise imports in 1980, compared with 10 percent in 1970. Mexico's principal agricultural imports consist of sorghum, corn, other grains, oilseeds, nonfat dry milk (NDFM), breeding cattle, and various meat products.

### U.S.-Mexican Trade

Once a minor trade partner with the United States, Mexico has become our third largest trading partner, behind Japan and Canada. The United States supplies about 70 percent of the import needs of Mexico. West Germany ranks second, at about 5 percent [3]. The United States is also Mexico's largest market, taking about 78 percent of its total exports. Mexico's second largest export market is Spain, which buys only about 8 percent of its

Table 8—Mexico's foreign debt and debt service

Item	1975	1980	1981	1982
<u>Billion dollars</u>				
Total external debt	20.1	50.7	74.9	84.6
Public external debt 1/	8.3	29.2	33.6	42.7
Interest on total external debt	1.3	5.4	8.3	11.3
Total debt service payments	2.1	17.6	29.8	29.7
Exports of goods and services	6.8	23.6	29.1	27.3
Petroleum sector exports 2/	.5	10.4	14.6	16.6
Ratio of debt service to exports of goods and services	31	75	103	109
<u>Percent</u>				

1/ Disbursed only.

2/ Includes crude exports plus petroleum products and natural gas.

Sources: [4, 16, and 69].

Table 9---Mexico's exports and imports

Item	1970	1975	1980	1983	1984
<u>Million dollars 1/</u>					
Merchandise exports:					
Agricultural crops	1,373	3,062	15,308	22,312	24,054
Coffee	422	719	1,407	967	1,306
Cotton	74	194	437	424	475
Tomatoes	124	175	321	116	208
Livestock and fish	108	133	185	112	221
	201	173	120	221	154
Metals and minerals	184	208	512	524	539
Petroleum and gas	38	438	10,441	15,143	15,196
Manufactured goods	444	1,525	2,653	5,448	6,843
Other goods	84	172	175	0	16
Merchandise imports	2,461	6,582	18,486	8,551	11,254
Consumption goods	528	444	2,426	614	848
Intermediate goods	798	4,241	11,028	5,740	7,833
Capital goods	1,135	1,897	5,032	2,197	2,573

1/ Valued at f.o.b. prices.

Source: [2].

Table 10--Foreign trade in agricultural products relative to total merchandise trade, 1970-80

Year	Exports of agricultural products		Imports of agricultural products
	Including petroleum	Excluding petroleum	
<u>Percent of total trade</u>			
1970	48.2	49.8	10.1
1975	29.1	34.0	13.1
1980	10.1	32.5	16.5
1984	5.4	14.7	15.1

Source: [2].

exports. Mexico and the United States exchanged more than \$27 billion worth of goods in 1980 and \$17 billion in 1983 [67].

The two countries have become uniquely interdependent over the past decade because the United States, as the world's largest energy consumer and food exporter, shares a 2,000-mile border with the world's fourth largest petroleum producer, a country that must turn increasingly to external markets to feed its people.

The United States overwhelmingly dominates Mexico's imports despite the declared policy of the Mexican Government to reduce its dependence on the United States and divert more of its trade to other countries. Although Mexico has signed bilateral trade agreements

with Japan, West Germany, and others in recent years, the United States will likely retain its dominance for some time. Mexico's major exports are mostly raw materials and agricultural products, including petroleum, coffee, fresh tomatoes, minerals, chemicals (including petrochemicals), and natural gas. Petroleum accounts for about 75 percent of Mexico's total merchandise exports. Mexico's imports consist largely of capital goods, such as specialized industrial machinery, power-generating machinery and equipment, telecommunications equipment, and transportation equipment. Imports also include intermediate products and raw materials.

From 70-90 percent of Mexico's agricultural trade is with the United States (tables 11 and 12). Mexico is frequently the second largest agricultural supplier to the United States (behind Brazil), and in the early eighties, has typically ranked in the top five markets for U.S. farm exports. Traditionally, Mexico had an agricultural trade surplus with the United States. This gap narrowed slowly until 1979 when farm trade balanced out at about \$1 billion for each country. In the eighties (except for 1982), the United States showed a net surplus in farm trade each year. Mexico's rapidly growing food and feed demands will likely cause the trade balance to remain in the U.S. favor for some time.

Table 11--Mexico's exports and the U.S. share

Year	Merchandise exports			Agricultural exports		
	Total (a)	To U.S. (b)	U.S. share (b/a)	Total (c)	To U.S. (d)	U.S. share (d/c)
	<u>-----1,000 dollars-----</u>			<u>-----1,000 dollars-----</u>		
1969	1,385	932	67	609	409	67
1970	1,373	833	61	512	386	75
1971	1,363	840	62	514	384	75
1979	8,819	6,180	70	2,076	1,229	59
1980	15,308	9,467	62	1,795	1,059	59
1981	19,420	10,530	54	1,664	1,102	66
1982	20,929	11,116	53	1,448	1,158	80
1983	22,312	12,988	58	1,402	1,279	91
1984	24,054	13,962	58	1,737	1,278	74

Sources: [3 and 67].

Table 12--Mexico's imports and the U.S. share 1/

Year	Merchandise imports			Agricultural imports		
	Total (a)	To U.S. (b)	U.S. share (b/a)	Total (c)	To U.S. (d)	U.S. share (d/c)
	<u>-----1,000 dollars-----</u>			<u>-----1,000 dollars-----</u>		
1969	2,078	1,297	62	140	79	56
1970	2,461	1,566	64	234	141	60
1971	2,254	1,384	61	215	124	58
1979	12,503	7,540	60	1,206	1,024	85
1980	19,431	12,150	63	3,062	2,468	81
1981	23,930	15,859	66	3,346	2,432	73
1982	14,422	8,969	62	1,694	1,156	68
1983	8,551	5,454	64	2,196	1,942	88
1984	11,254	7,365	65	2,342	2,015	86

1/ Valued at f.o.b. prices.

Sources: [3 and 67].

## Agricultural Exports

Coffee continues to be Mexico's principal agricultural export; almost 30 percent of U.S. imports from Mexico consist of coffee (tables 9 and 13). However, Mexican coffee constitutes only about 10 percent of total U.S. coffee imports. No notable problems exist in the trade in coffee, which enters the United States free of duty and does not compete with U.S. products. The Mexican Coffee Institute, INMECAFE, controls exports in conformance with the International Coffee Agreement quota system.

Another valuable export crop for Mexico is fresh tomatoes, which account for over 12

Table 13--U.S. agricultural imports from Mexico, principal commodities

Commodity	1975	1980	1981	1982	1983	<u>Million dollars</u>	
Beef and veal	18.6	0.6	2.1	0.9	3.5		
Live cattle	25.1	88.8	68.3	115.0	138.9		
Fresh tomatoes	64.1	131.0	237.3	173.4	227.2		
Frozen/fresh strawberries	19.2	24.9	25.0	15.9	14.8		
Molasses	22.0	16.7	3.7	6.0	4.5		
Cocoa beans and chocolate	5.0	21.6	9.1	4.7	19.3		
Coffee	138.4	311.3	248.3	264.4	276.7		
Fibers	16.1	18.0	11.1	14.5	7.0		
Other	200.1	446.4	497.2	563.2	597.1		
Total <u>1/</u>	508.7	1,059.0	1,102.0	1,158.0	1,279.0		

1/ Totals may not add due to rounding.

Source: [67].

percent of Mexico's agricultural export earnings. The United States is the major market for Mexican tomatoes and other vegetables, including cucumbers, peppers, eggplant, squash, and asparagus. During the winter, Mexico is virtually the sole foreign supplier of fresh vegetables to the U.S. market, accounting for 50 percent of U.S. supplies. Mexican production of winter vegetables is concentrated in the fertile valleys of the western state of Sinaloa [see map on inside front cover]. This industry is very modern, basing production on exporting to the United States. Because of competition with U.S. suppliers, trade in these products has been one of the contentious issues in U.S.-Mexican agricultural trade relations.

Other produce exported by Mexico includes strawberries and citrus fruits. Strawberry production, concentrated in central Mexico, and frozen strawberry exports have been so large as to force the United States to establish a quota system. Changing market conditions resulted in the quota never being imposed on Mexican frozen strawberries. In recent years, Mexican exports of strawberries have declined because of both the deteriorating quality of Mexican produce and a shortage of domestic sugar for processing. The major Mexican citrus exports are frozen orange juice concentrate, fresh oranges, limes, and grapefruit. The United States is the major market for these exports.

Live cattle, another major export, enter the United States as feeder cattle to be finished at feedlots before slaughter. Until 1979, Mexico supplied beef to the United States based on a specific country quota under the U.S. Meat Import Act of 1964 (later superseded by the Meat Import Act of 1979). The growing demand for meat within Mexico resulted in a Mexican domestic shortage of meat and in the cessation of exports in the late seventies.

The Mexican Government attempted to stop the export of live cattle early in 1979 so as to satisfy the demand for beef in Mexico City and other metropolitan areas. This effort was largely unsuccessful. Much of the beef is produced in northern Mexico where transportation costs, price differentials, and established marketing procedures all dictated

the continuation of the northward flow of cattle. Cattle exports were still controlled by an annual quota and licensing procedure, and export taxes were charged.

The United States generally levies low import duties on Mexican goods. For complementary products, such as coffee, cocoa, bananas, and other tropical products, few trading problems exist. Most of these types of commodities enter the United States free of duty, at times under the Generalized System of Preferences (GSP). Mexico is one of the major beneficiaries of the U.S. GSP system for both agricultural and industrial products, although many of its noncomplementary horticultural products are excluded from the GSP because Mexico provides more than half of the U.S. imports of these products.

### Agricultural Imports

Mexican agricultural imports in 1980 were more than double those of 1979, and over four times greater than in 1975. In the early eighties, Mexico's import bill averaged approximately \$2.5 billion (table 12). The bulk of the imports, and the greatest growth area, is in basic commodities such as grains, oilseeds, and nonfat dry milk (NDFM). Mexico was once a net grain exporter and essentially self-sufficient in the production of corn and beans, its major staple crops. Production increases have not kept pace with growing demand, and several years of adverse weather and poor production reduced Mexican stocks of these important commodities to critical levels. The result was the dramatic increase in imports of corn, beans, sorghum, and wheat, almost exclusively from the United States (table 14). Sorghum and corn ranked fourth and fifth among total Mexican imports in 1980, and corn amounted to more than 27 percent of U.S. agricultural exports to Mexico that year.

Mexican imports of oilseeds have also been growing rapidly. The principal imported oilseed is soybeans, but cottonseed and sunflower seed are also imported. Mexico does produce soybeans, sesame seed, and cottonseed, but not in sufficient quantities to meet both food and feed requirements. The United States was the primary supplier of oilseeds (table 14).

Mexico is also a deficit dairy producer and relies heavily on imported nonfat dry milk to meet consumer needs. This is the only major Mexican agricultural import for which the United States has not been the dominant supplier (table 15). Mexico purchases most of its dry milk from Canada, Ireland, Australia, and New Zealand.

The U.S.-Mexican Supply Agreement of 1980 resulted in a USDA commitment to assist

Mexico in securing basic commodities, primarily by establishing contacts between U.S. exporters and the Mexican Government, by permitting the use of USDA facilities for the holding of public tenders, and by working jointly to resolve problems that arose in the shipment of goods. This agreement has been renewed each year since 1980, with the amount and selection of commodities modified to reflect Mexico's import needs for that particular year.

Table 14--Mexico's grain and oilseed imports, 1969-83

Year	Grain imports			Oilseed imports		
	Total	From the United States	U.S. market share	Total	From the United States	U.S. market share
-----1,000 tons-----						
1969	87	77	88	44	30	67
1970	607	541	89	182	156	86
1971	250	246	98	87	86	100
1979	3,320	3,299	99	422	422	100
1980	7,954	7,815	98	1,418	1,347	95
1981	6,920	6,073	88	1,500	970	65
1982	2,283	2,160	95	1,143	1,093	96
1983	8,747	8,102	93	1/1,351	1/1,338	99

1/ Does not include oilseed products.

Sources: [3, 66, 67].

Table 15--U.S. share of Mexico's agricultural imports, 1969-81

Commodity	1969-71 average		1974-76 average		1979-81 average	
	All sources	U.S. share	All sources	U.S. share	All sources	U.S. share
	Million dollars	Percent	Million dollars	Percent	Million dollars	Percent
Live animals	11.0	83	38.1	93	46.7	70
Meat and products	5.4	92	18.9	88	61.8	83
Dairy and eggs	25.4	34	68.1	21	209.0	30
Cereal and products	23.5	92	353.6	84	965.0	95
Fruit	7.8	75	11.7	81	30.6	83
Vegetables	7.8	75	37.2	75	208.8	98
Sugar and products	2.2	71	3.1	80	136.6	76
Coffee, tea, cocoa, spices	4.0	20	6.4	36	12.7	29
Feedstuffs	21.6	41	27.9	59	79.5	96
Fats, shortening	9.8	96	23.1	96	34.9	91
Beverages and tobacco	8.0	32	28.2	28	66.0	5
Hides and skins	17.6	99	31.7	1	87.0	98
Oilseeds	10.3	99	73.6	79	335.8	83
Rubber, gums	10.3	0	26.9	0	36.3	4
Textile fibers	14.3	10	14.5	21	35.2	20
Animal and vegetable materials	10.6	80	25.3	79	48.8	74
Animal fats and vegetable oils	11.9	82	50.6	88	67.2	93

Sources: [66 and 67].

More important, however, the United States granted Mexico \$1.7 billion in credit guarantees under the GSM-102 program in fiscal year 1983, when Mexico's weakened foreign exchange situation clearly threatened its ability to import foodstuffs. These credit guarantees enabled the United States to regain all of the Mexican sorghum and soybean markets, which Argentina and Brazil had captured in recent years. The GSM-102 allocation for fiscal year 1984 was \$790 million. Nevertheless, Mexico purchased about 600,000 tons of Argentine grains and oilseeds, partly as a result of lower prices. These purchases also represent an attempt by the Government to diversify its trade partners. Despite these efforts, the United States will likely remain Mexico's major supplier of agricultural products through the decade.

### THE AGRICULTURAL SECTOR

Mexican agriculture by any standard was a success from 1940-65 when annual production rose at an average rate of 5.7 percent, which was a faster and greater sustained rate than in the history of any other Latin American country [71]. During this period, employment increased, incomes rose, and the nation began to advance the social and economic well-being of its population.

Beginning in 1965, a number of factors began to converge to retard growth in the farm sector (table 16). The greatest factor was the slowdown in the expansion of irrigated area as the costs of bringing marginal land into production increased (table 17). Furthermore, as the expansion of irrigation slowed, yield improvements were not enough to assure a continuing growth of output or of farmers' incomes.

Before 1970, Mexico had sufficient resources to feed itself and to export substantial amounts. As growth in the supply of farm commodities began to slow, the demand for them started to accelerate, stimulated at first by a population of over 45 million growing at a rate of 3.6 percent per year in the early seventies and later by a society made more prosperous by its oil exports. By the end of the seventies, the country had become an importer of basic foodstuffs.

The search for remedies began. In March 1980, the Government announced a comprehensive food and fiber plan, the SAM, to achieve self-sufficiency in basic food and feed products by 1985. However, in the wake of falling oil prices, skyrocketing interest rates, and rising debt service, SAM proved to be too costly. When Miguel de la Madrid Hurtado became president in 1982, he pledged a return to "economic reality," and indicated that his administration would be more amenable to relying on trade to satisfy Mexican farm product demand.

Table 16--Selected indicators of agricultural change, 1960-80 1/

Item	Annual change		
	1960-70	1970-75	1975-80
Percent			
Total agriculture:			
Output	4.4	4.0	4.3
Crops	4.5	2.3	2.1
Livestock 2/	4.2	7.0	7.0
Total food	5.0	4.5	4.7
Selected commodity groups:			
Subsistence crops 3/	4.5	.3	3.2
Export crops 4/	3.2	2.7	1.7
Livestock feed 5/	15.1	30.1	1.4

1/ Constructed from annual production data multiplied by a 1969-71 price weight.

2/ These growth rates are suspect: when SARH completed the livestock census in 1979, production figures were revised by as much as 40 percent but only back to 1972. Consequently, the 1969-71 base period still reflects the old series, while 1972 forward reflects another data series.

3/ Corn and dry beans.

4/ Sugarcane, tobacco, cotton, sesame, cantaloups, tomatoes, green peppers, strawberries, coffee, cocoa beans, and henequen.

5/ Sorghum and soybeans.

Source: [68].

Table 17--Distribution of total harvested area between irrigated and rain-fed acreage

Year	Total harvested area	Rain-fed area	Irrigated area		
			Irrigation districts	Other	Total
1,000 hectares					
1960	11,364	NA	1,752	NA	NA
1970	14,975	NA	2,484	NA	NA
1975	15,488	NA	3,081	NA	NA
1980	17,824	13,239	3,397	1,188	4,585

NA = not available.

Source: [69].

## Structure of Agriculture

Just before the 1910 revolution, about 97 percent of the land in Mexico was owned by 830 people or corporations; about 500,000 small and medium-scale farmers held 2 percent of the land and municipalities held the rest. Approximately 3.5 million peasants were landless. After a half century of land reform, the 1970 census showed that 4.5 million peasants were landless, the increase following Mexico's high birth rate. Approximately 2.9 million people owned or had usufructuary rights to land (right to use and earn income from land without ownership).

A unique form of landholding, the *ejido*, developed in Mexico in the wake of the revolution. After the Government expropriated most of the holdings of the large landowners, it redistributed them to communities that had owned them earlier (table 18). The Government retains title to the land so that the wealthy cannot regain control of it. The people to whom the plots are given are called *ejidatarios*, who typically work the plots as individuals. The land cannot be sold, but remains in the custody of the individual for life, provided the peasant farmer continues to work the land. The plot can be bequeathed to the *ejidatario's* heirs. This practice has led to extreme fragmentation of agricultural land in some states.

Some collective *ejidos* evolved in areas where cultural traditions favored collective

Table 18--Farm area by type of ownership, 1930-70

Census year	Total farm area	Ejidos	Colonos	Private
<u>1,000 hectares</u>				
1930	131,594	8,345	6,000	117,250
1940	128,749	28,923	6,069	93,757
1950	145,517	38,894	7,554	99,069
1960	169,084	44,497	8,735	115,852
1970	139,868	60,533	9,191	70,144
<u>Percent</u>				
1930	100.0	6.3	4.6	89.1
1940	100.0	22.5	4.7	72.8
1950	100.0	26.7	5.2	68.1
1960	100.0	26.3	5.2	68.5
1970	100.0	43.3	6.6	50.1

Source: (57).

farming methods. The Government also resettled some individuals (*colonos*) on federally owned land under Government sponsorship and offered them the chance to buy the land (table 19).

The land tenure law stipulated that land could not be expropriated from private owners if it was within certain limits: 100 hectares of irrigated land; 200 hectares of unirrigated land; 150 hectares of cotton; 300 hectares of bananas, sugarcane, cocoa, fruit trees, henequen, and a few other perennial crops; or the amount of land necessary to maintain 500 head of cattle. This did not, however, mean that land in excess of these amounts would be expropriated and, in fact, many holdings still exceed these limits. Only a legally qualified village within a 7-mile radius of the land in question can petition the Government to begin expropriation proceedings.

Both private farmers and *ejidatarios* typically own 1-5 hectares (table 20). Numerous private farmers work on tiny plots of 1 hectare or less. Nine percent of private farmers own more than 20 hectares, compared with 1 percent of *ejidatarios* who own that much. Most *ejidos* are subsistence farms, but over 6 percent, located principally in the irrigated northwest region, are modern (table 21). Only about 8 percent of private farms are termed modern, with the remainder split nearly equally between traditional and subsistence farms. (For definitions, see footnotes to table 21.) More than half of

Table 19--Distribution of farms by type of tenure, 1970

Operator	Number	Area		Percentage of area
		Thousands	1,000 hectares	
Owners	931.5	62,244.0	44.5	
Renters	NA	3,669.8	2.6	
Colonos	14.7	1,017.1	.7	
Occupants without land titles	20.4	1,747.8	1.2	
Ejidos	22.7	69,724.1	49.8	
Other	23.6	1,465.4	1.0	
Total	1,012.9	139,868.2	100.0	

NA = not available.

Note: Farm totals in tables 19 and 21 are not consistent due to changes in definitions of farm categories.

Source: [57].

Mexico's farms are subsistence farms; they earn only 20 percent of total farm income.

### Physical Characteristics

Mexico has a land area of about 192 million hectares, 30 million of which are arable. About 23 million hectares are cultivated, and another 7 million are potential farmland. <sup>2/</sup> Of the remaining area, 74 million hectares are rangeland (some of it extremely dry), 44 million hectares are forested, and 45 million are either too dry, too wet, or too steep for agricultural production [57, 71].

About 40 percent of the arable land has high to moderate crop production potential with adequate rainfall, irrigation, and water control. The remaining 60 percent is too steep, severely eroded, or has other physical

<sup>2/</sup> The cultivated area includes 5 million hectares of irrigated land, developed at a cost of about 90 percent of the public sector's investment in the agricultural sector over the past three decades.

Table 20--Size of holdings by type of land tenure, 1970

Area	Ejidos		Private farms	
	Parcels	Area	Parcels	Area
<u>Percent</u>				
0-1 ha	13.3	2.1	34.1	1.6
2-5 ha	46.1	27.0	34.7	7.6
6-10 ha	28.2	40.4	12.1	7.4
11-20 ha	8.4	23.7	9.7	12.9
21-100 ha	1.0	6.8	7.3	30.0
101 ha and over	0	0	2.1	40.5

Source: [57].

characteristics that restrict its potential. Most soils need additional nitrogen and phosphorus for crop cultivation. Although arid and semiarid areas in northern Mexico have the best soil, the continuous use of ground water is causing some of it to become saline and unusable. Water for further irrigation developments is relatively scarce. The Mississippi River normally has more volume than all the Mexican rivers combined [31].

Water resources are poorly distributed for agricultural use; water is plentiful in the southern part of the country but is needed in the north. Precipitation is poorly distributed geographically and seasonally. Also, rainfall is highly variable, exceeding or falling short of normal by 30-50 percent in 1 of every 3 years.

The varying climate of Mexico supports a wide variety of crops and livestock. In the northwest and north, winter temperatures are cool enough to grow cotton, sorghum, soybeans, dry beans, and corn (see map on inside back cover). In the tropical highlands and coastal plains of central, southern, and southeastern Mexico, agricultural potential is determined largely by altitude. At low elevations, tropical crops, such as coffee, sugar, and pineapples, are cultivated. Above 1,800 meters, wheat, deciduous fruit, and temperate climate vegetables can be grown in the winter. In the summer, cotton can be grown on 60 percent of the tropical area, and corn and other less demanding summer crops on 80 percent of the area.

### Regional Characteristics

Population and agricultural activity have concentrated in the center of the country,

Table 21--Farm profile, 1970

Item	Total	Ejido	Private	Share of total		
				Farm units	Cropland	Farm income
<u>1,000 farms</u>						
Total farms	2,815	1,858	957	100	100	100
Modern <sup>1/</sup>	201	120	81	7	19	44
Traditional <sup>2/</sup>	1,140	676	464	40	47	36
Subsistence <sup>3/</sup>	1,474	1,062	412	53	34	20

<sup>1/</sup> Farmers using modern technology.

<sup>2/</sup> Farmers producing cash crops by antiquated methods.

<sup>3/</sup> Farmers producing little for the cash market.

Source: [48].

where fertile plateaus are complemented by relatively favorable weather. Almost 25 percent of Mexico's arable area is located in the center, and 45 percent of the agricultural labor force work in that area. Small farms that grow corn and dry beans dominate the region (tables 22 and 23). Adequate rain and naturally fertile soil generally produce acceptable yields, with only moderate help from irrigation, improved seeds, and fertilizer. Agricultural activity is intense, and

this area has the highest ratio of cropland to arable land in the country. Some areas within this region have been so intensively farmed for centuries that yields are very low with no immediate prospect of a significant increase.

Although arid and semiarid conditions dominate in the northern regions, heavy public investment in irrigation and other infrastructure has made the Pacific North region the most productive for Mexican

Table 22--Regional distribution of harvested area of selected crops, selected years, 1970-80

Commodity and year	Pacific North	Pacific Central	Pacific South	North	North Central	Central	Gulf	Peninsula
<u>Percent</u>								
Corn:								
1970	1.7	23.5	15.3	4.2	14.4	24.8	13.7	2.5
1975	1.2	21.5	18.3	4.0	9.4	29.7	13.8	2.0
1980	2.3	22.2	19.7	1.9	8.0	29.6	13.7	2.8
Dry beans:								
1970	2.4	30.3	10.1	3.3	27.0	17.6	7.7	1.6
1975	3.9	17.4	10.0	10.8	33.7	19.3	3.9	1.1
1980	4.9	13.9	6.2	15.8	33.2	15.8	8.9	1.2
Rice:								
1970	23.3	14.1	15.1	--	--	11.5	32.1	4.0
1975	33.9	11.0	19.0	--	--	5.1	23.2	7.8
1980	31.6	10.4	8.9	--	--	4.8	15.3	29.1
Wheat:								
1970	60.1	7.3	--	20.6	3.1	8.9	--	--
1975	60.5	6.4	--	17.5	1.9	14.9	--	--
1980	62.8	7.1	--	13.5	3.0	13.6	--	--
Sorghum:								
1970	18.2	21.2	--	4.2	.7	24.8	31.0	--
1975	7.2	41.6	--	11.1	1.7	19.8	18.7	--
1980	9.2	25.8	--	4.5	1.7	16.9	41.9	--
Cotton:								
1970	59.6	5.8	7.0	17.8	9.8	--	--	--
1975	47.4	6.9	12.5	24.3	9.0	--	--	--
1980	55.9	4.1	9.7	23.7	6.8	--	--	--
Soybeans:								
1970	95.1	--	--	2.9	--	--	2.0	--
1975	89.6	--	--	1.8	--	--	8.7	--
1980	76.9	--	--	12.4	--	--	10.8	--
Safflower:								
1970	85.5	3.9	--	2.0	--	--	8.7	--
1975	85.2	2.0	--	2.2	--	--	10.7	--
1980	59.3	3.5	--	.8	--	--	36.4	--

-- = negligible.

Note:

Pacific North: Baja California Norte, Baja California Sur, Sonora, and Sinaloa. Pacific Central: Nayarit, Jalisco, Colima, and Michoacan. Pacific South: Guerrero, Oaxaca, and Chiapas. North: Chihuahua, Coahuila, and Nuevo Leon. North Central: Aguascalientes, Durango, San Luis Potosi, and Zacatecas. Central: Guanajuato, Hidalgo, Queretaro, Mexico, Puebla, Morelos, Tlaxcala, and Distrito Federal. Gulf: Tamaulipas, Tabasco, and Veracruz. Peninsula: Campeche, Yucatan, and Quintana Roo (see map on inside back cover for location of regions).

Source: [58].

agriculture. This area produces most of Mexico's wheat and soybeans, and yields are among the highest in the world (table 24). Intensive use of fertilizers, extensive irrigation, and large private operations with access to scarce credit have pushed cropland productivity to twice the national average. However, irrigation has been highly inefficient, largely because subsidized water rates and land tenure disputes have discouraged private investment to repair and modernize irrigation canals.

The Gulf region's vast semiarid pastureland makes it a center of commercial livestock production. Tamaulipas's dry climate is

suitable for raising sorghum, which has soared in recent years because of the livestock sector's increasing demand for feedstuffs.

Limited development of irrigation facilities in the North Central region made most crop growing much less versatile and price-responsive than elsewhere in northern Mexico. This area's agriculture is dominated by dry beans and dairy cattle.

Agriculture in Mexico's tropical regions is poorly developed despite reasonably good potential. The Gulf states are the most advanced of these regions, and the crops are more diverse than in any other area except the

Table 23-Regional distribution of crop production, selected years, 1970-80

Commodity and year	Pacific North	Pacific Central	Pacific South	North	North Central	Central	Gulf	Peninsula
<u>Percent</u>								
Corn:								
1970	2.4	35.6	11.9	3.1	7.6	20.3	17.2	1.9
1975	1.8	27.4	15.9	3.0	4.6	31.2	14.5	1.6
1980	1.8	27.6	18.0	1.5	3.9	33.0	12.8	1.4
Beans:								
1970	5.9	27.9	8.8	4.6	21.2	14.6	15.7	1.3
1975	8.4	29.5	12.8	19.4	18.8	2.9	6.7	1.6
1980	8.4	20.4	6.6	11.1	28.4	13.9	10.3	.9
Rice:								
1970	28.4	13.3	11.9	--	--	19.9	24.2	2.4
1975	41.3	12.3	15.5	--	--	8.3	16.9	5.6
1980	34.7	19.9	6.4	--	--	7.9	12.4	18.6
Wheat:								
1970	73.8	4.7	--	10.7	2.1	8.7	--	--
1975	70.4	3.5	--	11.9	1.0	13.2	--	--
1980	67.5	4.8	--	12.2	1.1	14.5	--	--
Sorghum:								
1970	17.6	25.4	--	4.4	.8	24.6	27.4	--
1975	7.7	40.1	--	11.2	1.6	18.9	20.5	--
1980	8.8	37.5	--	3.8	1.5	19.8	28.6	--
Cotton:								
1970	64.1	6.4	6.2	14.7	8.6	--	--	--
1975	48.9	6.5	10.3	24.4	10.0	--	--	--
1980	64.7	3.1	6.4	19.8	6.1	--	--	--
Soybeans:								
1970	97.1	--	--	2.3	--	--	.6	--
1975	92.8	--	--	2.2	--	--	4.9	--
1980	81.7	--	--	13.9	--	--	4.5	--
Safflower:								
1970	90.1	2.9	--	1.9	--	--	5.3	--
1975	91.6	2.2	--	2.7	--	--	3.5	--
1980	74.5	5.3	--	.8	--	--	19.5	--

-- = negligible.

See table 22 for footnotes.

Source: [58].

Table 24--Estimated yields of selected crops by region, 1970, 1975, and 1980 <sup>1/</sup>

Region and commodity	1970	1975	1980
	<u>Tons/hectare</u>		
Pacific North:			
Beans	1.28	1.01	0.98
Corn	1.76	1.88	1.39
Rice	3.29	3.40	4.07
Wheat	3.78	4.24	4.44
Cottonseed	1.43	1.46	1.66
Safflower	1.73	1.66	1.44
Sesame	.65	.77	.50
Soybeans	1.96	1.80	2.22
Sorghum	2.73	3.03	3.29
Pacific Central:			
Beans	.48	.79	.85
Corn	1.80	1.60	2.27
Rice	2.54	3.12	7.13
Wheat	1.98	1.98	2.76
Cottonseed	1.47	1.33	1.40
Safflower	1.20	1.24	1.71
Sesame	.64	.52	.60
Sorghum	3.39	2.74	4.95
Pacific South:			
Beans	.46	.60	.62
Corn	.93	1.10	1.69
Rice	2.13	2.28	2.69
Cottonseed	1.18	1.17	1.08
Sesame	.65	.44	.53
North:			
Beans	.74	.84	.41
Corn	.87	.94	1.50
Wheat	1.60	2.49	3.74
Cottonseed	1.10	1.42	1.26
Safflower	1.56	1.43	1.13
Soybeans	1.53	2.18	2.34
Sorghum	2.98	2.99	2.88
North Central:			
Beans	.41	.26	.49
Corn	.63	.62	.89
Wheat	2.16	1.96	1.23
Cottonseed	1.16	1.56	1.48
Sorghum	3.14	2.67	3.14
Central:			
Beans	.44	.07	.51
Corn	.97	1.32	2.04
Rice	4.68	4.55	6.18
Wheat	2.99	3.50	4.41
Sorghum	2.81	2.72	4.00
Gulf:			
Beans	1.08	.80	.67
Corn	1.50	1.33	1.71
Rice	2.04	2.04	3.01
Safflower	1.00	.38	.61
Soybeans	.54	.99	.87
Sorghum	2.50	3.12	2.33
Peninsula:			
Beans	.42	.69	.43
Corn	.92	1.02	.92
Rice	1.60	2.03	2.37

<sup>1/</sup> See table 22 for footnotes.

Pacific North. Even so, more than half of the cropland in the Gulf region risks flood damage because of insufficient water control projects.

Rain-fed agriculture on subsistence plots characterizes the heavily populated Pacific South region. The region's physical characteristics are especially diverse. Most farmers cultivate corn and graze livestock herds on steep, badly eroded slopes, while commercial farmers cultivate crops like cotton, coffee, and rice along the coastal plain.

The Yucatan Peninsula has the least favorable climate and soil for crop production in the tropical regions. Henequen fiber had been the only commercial crop produced in the Yucatan, but some vegetables are now produced there to supply resort areas on the coast.

In the Central, Pacific South, and Yucatan Peninsula regions, worker and land productivity are well below the national average because of the large number of small holdings, the large and technologically poor rural labor force, and the inadequacy of Government spending for irrigation, flood control, training, and credit.

### Livestock Production

Largely because of the land-extensive nature of cattle production, political and legislative restrictions on the size of landholdings have been in almost constant conflict with continued development of the cattle industry. The Agrarian Reform Code (which dates back to the Mexican revolution) and its subsequent modifications permit ranchers to own only as much land as needed to support 500 head of cattle. In some of the drier areas, this means 25,000 to 30,000 hectares [71].

Ranchers once ran the risk of having their grazing land reclassified as farmland (and therefore subject to a 200-hectare maximum for rain-fed land or a 100-hectare maximum for irrigated land) if they planted forage crops or made any improvements that might be construed as a conversion to cropland in the eyes of agrarian reform officials. This code clearly limited the adoption of more productive technology. In 1981, the Government recognized the limitations of the code and passed the Law for Agriculture and

Livestock Development. This law encouraged the production of fodder crops on pastureland, but provided for the expropriation of idle lands [56]. Even so, the agrarian reform laws remain on the books, meaning that the interpretation and enforcement of these legal contradictions are entirely discretionary and usually determined by political considerations.

### Cattle Production

About a third of cattle production is in the north, near the U.S. market. Most of the cattle are shipped live and purchased by U.S. feedlot operators. The more common breeds include Hereford, Aberdeen, Angus, Charolais, Santa Gertrudis, and some crossbreeds.

The most numerous production systems are cow-calf operations. Beef cattle feedlots are not common, although possibilities exist for development in areas bordering the United States where imported feed grains could be used more cheaply. Generally, however, a scarcity of feed, unfavorable cost/price relationships, restrictive tenure laws, and cattle export restrictions inhibit the development of large-scale feeding operations in the northern regions.

Approximately 25 percent of Mexico's cattle herds span the temperate region of central and west-central Mexico. Because of Government incentives to producers of basic food and feed crops, land-extensive cattle production systems have increasingly given way to more intensive confined or semiconfined production systems. A large variety of cattle breeds graze on fall-seeded grains during the winter and on crop residue following harvest [13]. Farmers use feed supplements during the remainder of the year. About 30 percent of Mexico's domestic beef production comes from this area.

Cattle production is a major activity in the Pacific South, Gulf, and Peninsula regions, where nearly 40 percent of Mexico's cattle are raised and about 40 percent of Mexico's beef is produced. In the wet tropical region, Zebu and Criollo cattle graze and receive little or no feed supplements [13]. The dry tropical region principally supports Zebu and Criollo and some European breeds such as Hereford, Aberdeen, and Angus. Although the cattle are

fed primarily on rangeland or pastureland, some supplements, such as feed concentrates and forages, are also supplied. This region supplies most of the beef consumed in the Federal District and other population centers of the central highlands.

### Swine and Pork Production

The Mexican swine industry changed substantially in the last 15–20 years. The industry was once dominated by many small-scale, traditional pork producers who used low-producing breeds and easily attainable inputs for feed. A large and growing segment of the swine industry, however, has adopted modern swine production systems (technical and semitechnical), which have been responsible for most of the growth in output [8].

Although data for the swine industry are inadequate and contradictory, they suggest that pork output advanced rapidly in the sixties and seventies. A large portion of the gains was due to more efficient feeding, increased litter size, and reduced death rates in the more advanced production systems. The modern pork producer generally uses more productive breeds, such as Hampshire, Duroc, and Yorkshire. In technical production systems, animals may be confined in buildings with heaters, air conditioning, and automatic feeders. These animals typically receive a well-balanced diet. Feedout times (birth to market) of 5–1/2 to 6 months have helped to increase output. In semitechnical production systems, fewer purebred swine are used, and production facilities are not as modern; feed is generally a combination of both compound feed and locally produced forage. Average feedout times for these types of producers vary from 6 to 12 months.

The technical and semitechnical hog production systems account for about 15 and 45 percent of total pork production, respectively [13]. Most of the advanced production systems are located principally in the northwest, in the states of Sonora and Sinaloa. Although located in major grain sorghum and oilseed zones, this region is distant from major pork product markets. The semitechnical production systems are concentrated in the west-central area, but can be found throughout the country.

The traditional swine production systems still account for about 40 percent of total pork production. Animals are raised on kitchen scraps, forage, and locally produced crop residue. Productivity tends to be low with the use of native breeds and the absence of modern inputs. Feedout times often exceed a year.

### The Poultry Industry

Mexico's poultry industry, once dominated by traditional producers, like the pork industry, is now a large, relatively efficient, concentrated, integrated industry. Over the past 20 years, increased use of balanced feed and other technologically advanced inputs, along with improved husbandry practices, increased poultry production. The high feed conversion efficiency of poultry made the industry's products available to a rapidly growing population at relatively low prices [7].

Major structural changes accompanied this progress. Poultry production became increasingly concentrated within a relatively small group of large producers. The average broiler operation contained between 2,000 and 10,000 birds. Of nearly 2,000 broiler operations, 2 percent produce over 60 percent of national poultry meat [13]. Both poultry producers and poultry feed producers have begun to vertically integrate their operations.

The Government aided the developing poultry industry [32]. Subsidies for feed helped to offset input costs. 3/ The Government imposed quotas on domestic breeding stock to prevent overproduction, which commonly

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3/ The most important subsidy to poultry production was for feed whose price was kept low through low prices of inputs to feed producers, primarily for sorghum and soybeans. The amount of the subsidy varied depending on grain and oilseed market conditions. The CONASUPO resale price of feed was generally below domestic market prices. Also, imported feed was sold at acquisition price plus handling and storage. The imported price was usually greater than the domestic market price, which provided an additional subsidy. Also, CONASUPO, during certain periods, supplied added subsidies in transportation and handling.

occurred in Mexican poultry production. The Government even entered feed production and other poultry input industries in an attempt to regulate market activities. Poultry producers tended to locate near major consuming centers to ease transportation difficulties.

Feed manufacturers who received subsidized feed inputs were expected to pass the subsidy on to poultry producers. The various agricultural feed input subsidies available to feed manufacturers were a major incentive for poultry producers to integrate into feed production. In 1980, an estimated 58 percent of the feed used in poultry meat production came from integrated operations [13]. This subsidy program is no longer in effect.

Poultry meat prices have been, for the most part, free of Government controls. However, as a means of removing seasonal price fluctuations in poultry meat, the Mexican Government occasionally placed temporary price ceilings on domestic poultry meat and authorized imports to stabilize domestic prices.

### Egg Production

Much like the poultry meat industry, Mexico's egg industry has developed over the past 20 years from small-scale rural production into a large commercialized, integrated industry. Increased use of balanced feed and other technological advances, along with improved husbandry practices, sharply increased egg production per hen.

The states of Sonora and Sinaloa contain the largest commercial egg production facilities. Although these operations are located in a major soybean-producing region, they are far from the major markets of the central and west central parts of the country. However, eggs can be transported easily and the distance apparently has had little effect on the growth of the region's egg industry. Both Sonora and Sinaloa have superior climates for egg production. Other major egg production states, Jalisco and Puebla, are near both feed centers and major markets. The average egg operation contained between 10,000 and 50,000 birds. Ten percent of the operations, all of which had more than 100,000 layers, produced over 45 percent of national egg output [13].

Strictly regulated by the Government, price controls are in place throughout the egg marketing chain from the producer to the consumer level. The Government holds that eggs are a basic food product that should be an integral component of the low-income consumer's diet. When the economy experienced increasing inflation during the seventies, controlled egg prices lagged well behind increases in overall consumer price levels. <sup>4/</sup>

To maintain egg production profitability during periods of rapidly increasing input prices, the Government initiated input subsidies to compensate for the small increases in sale prices. Feed manufacturers and integrated egg producers received major feed components, such as grain sorghum and oilseed meals, at subsidized rates; this subsidy was removed in November of 1984 [32]. Also, the Mexican Government entered mixed-feed manufacturing in an apparent attempt to exert some control over the prices and output of feed.

CONASUPO handles an estimated 15 percent of the total national egg supply. It usually purchases eggs from small- and medium-sized domestic egg producers, and imports eggs (fresh or dried) on behalf of the Government when necessary. CONASUPO also acts as a wholesale egg distributor and operates its own chain of retail stores (mobile stores and supermarkets, or CONASUPERS).

### Dairy Industry

Estimates from the Secretariat of Agriculture and Water Resources (known by its Spanish initials as SARH) and the National Milk Institute, indicate that domestic cow milk production increased by more than 4 percent annually in the seventies. Mexico's dairy herd recorded a 2.3- percent annual growth in the seventies, but a major source of the growth in cow milk output can be attributed to the modernization of the dairy industry, away from the land-extensive, low-yielding type of system to a higher yielding, intensive, and confined feeding system.

<sup>4/</sup> Between 1970 and 1980, retail prices for eggs increased 121 percent, whereas general prices increased 362 percent (table 34).

Unlike the highly specialized dairy cattle enterprises in the United States, those in Mexico vary widely in both type of production system and levels of output. Of a total dairy cattle herd of about 8 million animals, about 7 million are low milk-yielding mixed-breed Criollo cattle and 1 million are specialized dairy cows (Criollo crosses, Holstein, Jersey, and Brown Swiss). Daily milk output per cow ranges from 1 liter for grazing Criollo cows to 20 times that for advanced dairy operations [13].

More than 65 percent of all dairy cattle graze. These animals supply about 25 percent of the nation's milk production. About 20 percent of Mexico's dairy cattle herd is under a semiconfined system. The semiconfined animals produce about 15 percent of national milk production. Close to 60 percent of Mexico's national milk production comes from the 15 percent of the dairy herd managed under modern confined systems [13]. About half of these systems are located in Mexico's temperate zone in the center of the country, and a third are located in the arid/semiarid region in the north.

In land-extensive, grazing production systems, the chief feed is grass on ranges or pastures. Small amounts of locally produced forages and concentrates supplement grazing. Larger quantities of supplementary feed are fed, including alfalfa and forage from oats, corn, grain sorghum, barley, and beets on Mexico's more modern dairy farms.

The dairy producers who mix their own feed usually receive some portion of the grain and oilseed meal from CONASUPO at subsidized prices. When the dairy producer buys prepared feed, it is at a Government-regulated price, reflecting a subsidy to the feed manufacturer by CONASUPO. This subsidy includes discounted grain and oilmeal prices.

The Government maintains that milk is essential to the Mexican diet and fundamental to the physical development of the younger population. Fluid milk prices are under strict Government control to assure that milk is available to all consumers, especially the lower income groups.

Milk producers argue that slowly rising price ceilings do not keep pace with more rapidly

rising input prices. As a result, fluid milk production has declined as margins have declined, shifting raw milk to the production of cheese, butter, cream, and other dairy products whose prices are not controlled [32].

To provide adequate domestic milk and milk product supplies, Mexico has turned to the international market. The Government imported such products as powdered milk, evaporated milk, and cheese, among others, on a large scale throughout the seventies and into the beginning of the eighties. An overwhelming majority of foreign dairy products are imported and marketed by CONASUPO.

### Characteristics of Crop Production

Total cropland averaged 17.8 million hectares during 1979-81, the base period from which the projections were derived (see "Future Farm Product Demand"). Grains and oilseeds accounted for three quarters of total cropland during the base period. Three grains (corn, grain sorghum, and wheat) contributed to over three-fourths of all grain area, and three oilseed crops (safflower, soybean, and sesame) accounted for just under three-fourths of oilseed land.

### Grain and Dry Bean Production

Corn, grown throughout the country, occupied 54 percent of total Mexican cropland, according to the 1970 agricultural census. The corn area expanded by only about 0.26 percent per year throughout the seventies, and averaged 7.95 million hectares per year during the decade. Corn yields (about 1.3 tons per hectare) rose 2.2 percent per year, which resulted in total production expanding at about 2.5 percent per year for the same period. However, yields remain far below both the world and Latin American averages [49].

Corn grows on all farms, from small subsistence plots to larger commercial farms, principally on rain-fed land. The Central region produces more corn than any other area, but the highest yields occur in the Pacific Central region, especially in Jalisco, the leading corn-producing state. Only 10-12 percent of corn land is irrigated, but 60

percent of corn area receives pesticides [69].

*Ejidos* and agricultural communities farm two-thirds of the corn area, a fourth is grown by private farms with more than 5 hectares, and the rest by private farms with fewer than 5 hectares [57].

Dry beans are grown mainly by the *ejidatarios*, who produce about 70 percent of all dry edible beans; private farms of more than 5 hectares provide most of the remainder. Most subsistence farmers with fewer than 5 hectares grow corn and beans, although their production is not a significant percentage of national production [57]. About 6 percent of dry beans grow in federal irrigation districts and slightly more than 20 percent of the bean area is planted with certified seed. Farmers use pesticides on slightly under 70 percent of the area planted to beans [69]. Mexican dry bean yields are just under both world and Latin American averages [49]. The North Central and the Pacific Central and Central regions produce about 65 percent of dry beans, and the rest grows throughout the country; the Pacific North has the highest yields.

Wheat was grown on about 6 percent of Mexico's harvested crop area in 1982. The Pacific North accounted for about 60 percent of wheat area and 70 percent of wheat production. The Central and Northern regions were also important wheat-producing areas.

The area devoted to wheat declined slightly in the seventies, averaging about 737,000 hectares in the early eighties. This decline, however, was offset by higher yields, which increased 2.9 percent annually through the seventies and averaged nearly 3.5 tons per hectare by the end of the decade, one of the highest average yields in the world [49]. Approximately 90 percent of the wheat area was irrigated, and nearly 93 percent of that was fertilized [32]. Farmers used the improved seed of the high-yielding dwarf varieties in all cases, and most farms were fully mechanized. Farmers applied pesticides to about 60 percent of the area planted [69]. The Government has used a variety of measures either to encourage or discourage wheat production over the years, principally price supports, water allocation, and credit.

According to the 1970 census, private farms of more than 5 hectares contained nearly 62 percent of the wheat area, private farms of less than 1 hectare contributed 1 percent, and ejidos and agricultural communities had the balance of the crop [57].

Rice was grown on about 1.3 percent of the harvested cropland in 1970. Two states, Sinaloa in the Pacific North region (where yields are highest) and Veracruz in the Gulf region, accounted for about 40 percent of the rice area. The Pacific Central region was another important producing area. Rice area expanded slowly, 0.3 percent per year throughout the seventies to average about 157,000 hectares by 1979-81. During the same time period, yields rose 3.6 percent annually, and averaged over 2.3 tons (milled) per hectare. Paddy rice yields were far above the world and Latin American averages [49]. Rice production grew about 3.2 percent annually throughout the seventies, and averaged 364,000 tons (milled) by 1979/81.

Agricultural communities and ejidos grew nearly 70 percent of the rice. Private farms of more than 5 hectares accounted for 29 percent of the crop and private farms of fewer than 5 hectares raised 1 percent of the rice [57]. Farmers applied pesticides to about 80 percent of the land planted in rice [69]. Approximately 45 percent of rice area is irrigated [32].

*Grain sorghum* is the major feed grain grown in Mexico, following a rapid expansion since the late fifties. The Matamoros area of Tamaulipas (Gulf region) accounted for more than 30 percent of Mexico's sorghum production. Sonora in the Pacific North and Guanajuato in the Central region were the other major producing areas. Sorghum yields, highest in the Pacific Central region, principally Jalisco, are nearly three times the world average and slightly above the Latin American average [49]. Thirty-five to 40 percent of sorghum cropland is irrigated, and certified seed is used for all sorghum production [32, 69]. Private farms of more than 5 hectares produce slightly more than half the sorghum. The rest is grown on ejidos and communal farms [57]. Fifty percent of the crop is harvested in the spring and summer; farmers harvest the remainder during the winter and spring.

Sorghum has gradually replaced other grains, such as corn and wheat, as the basic crop of the mixed-feed industry. Sorghum production increased dramatically for two important reasons. The first was the inability of Mexican corn production to keep pace with the increased population growth. As a result, Mexico needed all of its corn for human consumption and sorghum replaced corn in the feed industry. The second major factor was the sustained high growth rate of the livestock industry, which kept demand for feeds at a high level. These two factors combined to increase sorghum production, which grew by almost 4 percent per year during the seventies.

### **Oilseed Crops**

*Soybean* production emerged as Mexico's favored oilseed during the seventies. Three factors favor soybean production. First, soybeans rotate well with winter wheat in the important States of Sonora and Sinaloa. Soybeans provide greater profitability relative to other crop alternatives, especially when adequate water supplies are available for irrigation. Second, soybeans have a lower labor input requirement than other crops, especially cotton. Growers experienced an acute shortage of field labor in northwestern Mexico in the late seventies as continued migration of workers to the United States cut deeply into the labor supply. Third, and possibly most important, soybean production grew in response to the demand for soybean meal by the poultry and livestock industries.

Soybean production grew about 4.7 percent annually throughout the seventies, when huge increases in area planted offset slight yield declines. More than 75 percent of all soybeans are grown on large private commercial farms in the Pacific North region. Farmers irrigate approximately 60 percent of the area planted to soybeans. Farmers mostly use certified seed and apply pesticides to 75 percent of the area planted [69]. Soybean yields are nearly twice the world average and slightly more than the Latin American average [49].

*Safflower* production expanded rapidly, increasing by 12 percent per year during the seventies because of the upturn in planted acres. Ejido and communal farms grew more than 60 percent of the safflower, and the balance was grown on private farms of more

than 5 hectares [57]. More than 70 percent of the area planted to safflower is irrigated. Other inputs, such as certified seed and fertilizer, boosted yields to among the highest in the world [49]. The Pacific North region produces nearly 75 percent of the national total.

Mexico is one of the few countries in the world that produces safflower for its high-quality vegetable oil. When production declined, as the SAM made wheat more profitable to grow, Mexico imported sunflower seed as a substitute.

Cottonseed grows mostly in Mexico's Pacific North and North regions, equally split between *ejidos* and private farms larger than 5 hectares [57]. Yields are among the highest in the world because of irrigation (about 75 percent of cotton was irrigated) and abundant use of certified seed, fertilizers, and pesticides [69]. Production declined by nearly 3 percent throughout the seventies because of falling world prices for cotton, limited irrigation water supplies in some years, and Government incentives for basic food crop production in the late seventies.

### Production Limitations

Four out of every 10 years, on average, is a drought year for Mexico. That is one reason why Mexico has been unable to feed its growing population from domestic supplies. Furthermore, Mexico will probably be unable to increase irrigated area enough to reduce significantly its agricultural imports.

Expansion of Mexico's water districts faces both physical and economic constraints. In Mexico's rain-fed areas, drought in one year affects the harvest of corn, sorghum, safflower, and dry beans that same year; but in irrigated areas, the effect of drought on wheat, soybeans, cotton, spring sorghum, and winter vegetables is generally seen the following year.

Ground water tables in some irrigation districts (especially in the Northwest) are drawn down to the point where use generally exceeds normal replacement. Increasing salinity levels in the soil and water supplies have added to the problem. Together, these factors preclude any significant expansion of irrigation in or around established ground-

water irrigation districts. With Mexico's present financial condition, many capital-intensive projects are unlikely to be undertaken soon to expand the land base (table 25).

The best sites for dams and canals have already been developed over the past 35 years. Future irrigation projects will bring only less productive land into use. In December 1980, the World Bank estimated that it would cost \$395 million to bring 65,000 hectares into production in the Elota-Piaxtlo irrigation project in Sinaloa. This represents a cost of \$6,077 per hectare. In February 1982, it would have cost an estimated \$643 per hectare just to repair the existing Baja Rio Bravo-San Juan irrigation district.

Mexico will probably not attempt to reduce its agricultural import bill by changing its crop mix to plant more grains and oilseeds on land presently devoted to foreign exchange earners such as cotton and winter vegetables. In announcing the drive to achieve self-sufficiency in basic food commodities, the Government specified that self-sufficiency would not come at the expense of vegetable and cotton production, important crops not only for export but also for employment because of their labor-intensive cultivation. Furthermore, the few hundred thousand hectares planted to winter vegetables and cotton would not produce enough to alter Mexico's food deficit significantly. Weather and the formidable

Table 25—Possibilities for land expansion, by region

Land uses	North	Central	South	Peninsula	Total
	<u>Million hectares</u>				
Presently cultivated	8.47	7.67	3.96	0.79	20.84
Irrigated	3.31	1.61	.41	.03	5.36
Rain-fed	6.22	6.61	4.73	1.26	18.82
Medium-term potential 1/	10.29	8.74	5.60	1.44	26.07
Irrigated	4.07	2.13	.87	.18	7.25
Rain-fed	6.22	6.61	4.73	1.26	18.82
Total capacity 2/	13.67	8.83	6.91	2.96	32.37
Irrigated	4.66	2.20	2.80	.40	10.06
Rain-fed	9.01	6.63	4.11	2.56	22.31

1/ Until 1990.

2/ Includes soil use classes I-IV.

Source: [49].

cost of additional irrigated land, together with Mexico's high proportion of unproductive land, will frustrate all but the most intense efforts to achieve food self-sufficiency in the eighties.

### Marketing System

The agro-industry subsector is an important part of the national marketing system. For example, nearly 100 companies produce poultry and animal feeds for market, absorbing most of the domestic and imported supplies of sorghum, along with byproducts from oilseed and cereal processing.

The Government's tax and credit policies promote the growth of agro-industrial activity. Certain features of the grain supply and price management program, however, appeared to have an opposite effect, which may have slowed the rate of improvement in grain storage and marketing. An important feature of the program was that food and feed processors operated under a mixture of circumstances which included official selling prices for products, competition with CONASUPO plants, reliance on CONASUPO for raw material supplies, and a variety of financial transfers for which processors would qualify. For example, wheat millers have had to place orders for wheat with CONASUPO months in advance, making payment at the time of the order. Adjusted flour prices typically lag changes in milling costs. The system thus may have generated financial burdens for millers.

Because of difficulties with delivery schedules for CONASUPO, mills have had to plan a storage capacity beyond requirements. Feed plants faced markets that were strongly conditioned by lags in the adjustment of official prices for the products sold by their clients (such as dairy farmers). And if interruptions occurred in the subsidy-based component of their cash inflow, feed plants had to absorb the financial losses. For example, the difference between the support prices, which private plants were obligated to pay farmers for sorghum, and the official price for sorghum for use in animal feed, was payable to plants by CONASUPO.

Firm data on installed grain and oilseed storage capacity were not available. Estimates ranged from 10-12 million tons.

The private sector had about 3.5 million tons of capacity, including farmer associations and the agro-industrial complex. Public sector capacity is held mainly by the CONASUPO subsidiaries, BORUCONSA (Bodegas Rurales CONASUPO), and ANDSA (Almacenes Nacionales de Deposito). Besides these permanent facilities, storage space is rented, and temporary facilities are used. Published data indicated that the grain storage capacity of those two agencies totaled about 6.3 million tons at the end of 1980 (table 26).

A typical estimate of the loss of corn held on farms for home consumption or for sale in local markets was 10 percent of total weight over a 6-month period. The comparable figure for beans was 15 percent. Average weight losses reported by the private agro-industrial sector, over a 6-month storage period, including in-out handling, are about 4.5 percent for wheat, 6-7 percent for corn, and 7-8.5 percent for sorghum [44].

### AGRICULTURAL POLICIES

Mexico's diverse agriculture, in both production and organization, emanates from its rugged and complex topography, varied climate, and wide differences in the size and nature of farms. Agricultural policies and programs have attempted to strike a workable balance between two objectives: to increase production and exports and to improve the

Table 26—CONASUPO storage capacity, 1977, 1979, and 1980

Item	1977	1979	1980
<b>ANDSA 1/</b>			
Warehouses (number)	827	832	827
Storage capacity (1,000 mt)	4,243	4,213	4,387
<b>BORUCONSA 2/</b>			
Warehouses (number)	1,238	1,580	1,686
Storage capacity (1,000 mt)	1,334	1,491	1,957
Combined storage capacity (1,000 mt)	5,577	5,704	6,344

1/ In 230 locations, mainly the principal centers of population.

2/ Smaller, rural storage facilities.

Source: [49].

living conditions of the rural population. The main programs, implemented to achieve the production objectives, have emphasized increasing productivity, continuing land development and reform programs, assisting in pricing and marketing efforts, and protecting agricultural products from imports. Those programs have been supported by research, credit, and extension and education activities. Consumers have benefited from price ceilings and a governmental distribution system for basic food commodities.

The goal of achieving self-sufficiency goes back to the late forties. From then until the midsixties, the Government invested heavily in agricultural infrastructure. New lands were opened and irrigation was expanded in the northwestern and northern areas of the country. Other Government programs, some supported by the Rockefeller Foundation, resulted in the development of high-yielding wheats. Much of the basic research emphasized technology associated with irrigated production. These activities, along with ample credit policies and price-support levels (generally above the world price levels), spurred expansion of corn and wheat production. By the early sixties, Mexico exported those commodities but had to use export subsidies to promote sales.

Because of the heavy financial burden and a general change in the attitude of economic planners and Government officials during the midsixties, programs shifted from agriculture toward industrial development. Mexican officials also believed that no global food shortage existed or would likely occur.

By the midsixties, the rate of expansion in harvested area had declined because much of the easily developed large land tracts were in production. Real farm prices failed to keep up with increasing costs, and overall Government investment in the farm sector declined. Through the late sixties and early seventies, the Government expressed little concern about this change in developments. In 1973, the combination of a poor domestic grain crop, the sharp increase in world oil prices, and a poor world grain crop focused domestic attention on the farm sector. Government investment in agriculture began again to increase, but not at the rate of the forties and fifties. Many of the new investments again went to irrigation.

By the late seventies, however, officials felt that more resources and research should be directed toward rain-fed and tropical agricultural lands, areas that had been neglected. In 1977, the Government established the rain-fed districts program within the Secretariat of Agriculture to improve production on nonirrigated lands. However, until early 1980, emphasis continued on irrigation and irrigation technology.

### Production Policies

Shortfalls in agricultural production and the heavy reliance on imports of basic foodstuffs prompted a reorientation of Mexican food and agricultural policy through the SAM program in March 1980. The plan sought to avoid some of the problems that plagued other large-scale, oil-exporting countries, such as the distortion of consumption habits toward less essential items and a growing dependence on agricultural imports.

A comprehensive food profile of Mexico, completed in 1979, was the foundation of SAM's goals. Compared with previous surveys, the profile revealed significant changes in nutrition patterns since the late sixties. About 35 million Mexican diets failed to attain Mexico's minimum per capita daily nutrition requirements of 2,750 calories and 80 grams of protein. Of those 35 million people, more than half were seriously malnourished, 13 million in rural areas and 6 million in urban areas.

The SAM targeted a large part of its program on the rain-fed districts, a once-neglected sector with the poorest and most malnourished. Most of the small landholders and landless workers lived in these areas. The Government decided that the rain-fed districts had greater potential than irrigated areas for marginal increases in production. These areas are mostly in the central highlands.

The SAM's goals of self-sufficiency in corn and beans by 1982 and in other basic foods by 1985 involved expanding area devoted to staples and increasing yields. In 1980 and 1981, the SAM program included higher guaranteed prices, about a third more credit, preferential interest rates, and lower crop insurance premiums (by 3 percent). The Government subsidized fertilizer and certified

seed costs by 30 and 75 percent, respectively. The programs included a concept of shared risks, whereby the Government guaranteed the farmer a minimum amount of the product that would have been produced in cases of disaster or crop failure, with compensation based on local productivity norms rather than production costs. To qualify, the producers had to employ technological improvements that were promoted by local farmer organizations operating "in alliance with the state" [30].

The passage of the Agricultural Development Law in 1981 was a significant development in Mexico's agricultural policy. This law permitted producers on communal and private farms to pool resources to form larger, more efficient production units for easier access to credit. Other features of the law penalized the owners of idle land, encouraged production of forage crops on grazing land (an activity that earlier had been a basis for expropriation), and discouraged the division of properties into units of fewer than 5 hectares. The law also reinforced the shared-risks program.

The costs for subsidizing physical inputs and crop insurance, while maintaining high price supports and substantial consumer subsidies, rose by more than 500 percent during 1977-81. In real terms, the cost doubled and amounted to a 150-percent increase as a share of total Government spending [69]. When the de la Madrid government took office in December of 1982, it retained the basic objectives of the Portillo administration, but abandoned the costly SAM program in view of the country's economic problems. The de la Madrid administration instead announced the National Food Program (PRONAL) in 1983. Like the SAM, PRONAL's production objectives revolved around developing domestic food production in the rain-fed areas but not neglecting the irrigated areas. Whereas SAM focused on production, PRONAL focuses on consumption in view of the nutritional problem in Mexico, which became even more acute during the recent economic crisis. SAM's goal was self-sufficiency; PRONAL's is "food sovereignty," described as access to food, whether domestically produced or imported, to permit normal physical and mental development of the population. PRONAL singles out the existing marketing

and distributional network as the principal obstacle to achieving this goal. This network included excessive participation by brokers, market centralization, and inefficient transportation. PRONAL plans to improve the nutritional levels of low-income families by increasing productivity in the food-processing industry and improving food-marketing efficiency.

The other agricultural objectives of the de la Madrid administration were to:

- Promote producer organizations that can control and exploit their own productive resources.
- Resolve all land title disputes.
- Revise charges for water and equipment in irrigation districts to reflect actual costs.
- Promote more intensive livestock production.

The annual agricultural plan announced by SARH in 1983 provided for average support price increases of 85 percent, while input costs were expected to increase by 120 percent. The situation improved in 1984, as the average support price for major commodities was raised by 66 percent (October 1983 to October 1984) while the general inflation rate was 63 percent for the same period. Ceiling prices for tortillas, bread, sugar, and other basic foods were raised substantially, but these too are being eroded by inflation. In contrast to 1980-82, when an average \$3.6 billion was spent on the agricultural sector each year, about \$1.9 billion went for financial support of the agricultural sector in 1983 and an estimated \$2.7 billion was earmarked for 1984 [69].

### Price Supports

Mexico has long employed price supports to stimulate agricultural production. In the late sixties, price supports, in combination with high-yielding varieties, improved production to the point that Mexico was able to export significant amounts of both wheat and corn even when world prices dropped below domestic support prices (exports had to be subsidized). Support prices remained unchanged but were allowed to erode through

inflation. Some upward adjustments were made during the late seventies, especially when shortages began to appear after poor harvests. When these shortages emerged with worrisome regularity toward the end of the decade, the rate of increase in support prices was accelerated. In real terms, however, prices remained below 1970 levels (table 27). Not until the SAM was introduced in 1980 did the agricultural sector regain some lost ground. Nevertheless, even after huge increases in 1980 and 1981, the support prices for corn, beans, rice, and sorghum were still below 1970 levels in real terms.

Table 27--Support prices in nominal and real terms

Commodity and year	Nominal support price	Real support price (1970=100)
<u>Pesos/ton</u>		
Corn:		
1970	940	940
1975	1,500	1,054
1980	4,450	876
1981	6,550	1,002
1982	8,850	705
1983 1/	19,200	834
Dry beans:		
1970	1,750	1,750
1975	6,000	2,634
1980	10,000	2,362
1981	16,000	2,447
1982	21,000	1,681
1983 1/	33,000	1,449
Wheat:		
1970	800	800
1975	1,750	971
1980	3,550	699
1981	4,600	704
1982	6,930	552
1983 1/	18,200	799
Rice:		
1970	1,100	1,100
1975	2,500	1,664
1980	4,500	886
1981	6,500	994
1982	8,600	685
1983 1/	21,000	922
Sorghum:		
1970	625	625
1975	1,600	887
1980	2,900	571
1981	3,930	601
1982	5,200	414
1983 1/	13,600	597

1/ As of October 1983.

Source: [52].

Throughout the seventies, Mexico's price supports for corn, wheat, sorghum, and soybeans remained above U.S. farm gate prices (table 28). By 1981, with SAM fully in place, the domestic price for corn in Mexico was more than double the U.S. price. Wheat, sorghum, and soybean prices were 37, 67, and 95 percent higher, respectively, in Mexico than in the United States. Except for wheat, Mexican support prices also exceeded world export prices throughout the seventies and early eighties. But Mexico's financial crisis in 1982 and the subsequent peso devaluations reversed this trend, and Mexican support prices have remained below both U.S. and world prices.

Table 28--International grain and oilseed price comparisons

Commodity and year	Mexico 1/	United States 2/	World 3/
<u>Dollars/ton</u>			
Corn:			
1970	75	52	58
1975	140	100	119
1980	193	122	125
1981	262	98	131
1982	154	106	109
1983	128	4/133	136
Wheat:			
1970	64	48	63
1975	140	130	181
1980	154	144	191
1981	184	134	196
1982	121	129	167
1983	121	4/129	170
Sorghum:			
1970	50	45	51
1975	128	92	118
1980	126	116	129
1981	157	94	126
1982	91	99	109
1983	83	4/117	129
Soybeans:			
1970	104	105	117
1975	280	181	220
1980	348	278	296
1981	432	222	288
1982	268	209	245
1983	206	4/301	282

1/ Support price.

2/ Farm gate price, season average.

3/ Average worldwide export price, World Bank.

4/ Preliminary.

Sources: [52, 54, 68].

## Input Subsidies

The Government has offered numerous and substantial input subsidies to agriculture to encourage adequate production and to keep food prices low for Mexico's urban and rural poor. Input costs (principally fertilizer, improved seed, credit, irrigation, fuel, and crop insurance) rose far less than crop prices over the past 30 years (table 29). Livestock product prices gained slightly, compared with costs over the same period. Subsidies have encouraged the consumption of modern inputs over the years and outlays for such items became important elements of production costs on more advanced farms.

*Fertilizer* prices have declined in real terms since 1965. The real price of urea fell, on a 1960 base, from 1,231 pesos per ton in 1965 to 687 pesos in 1978, and to 550 pesos by 1982 [69]. This decline in fertilizer prices resulted in an increasingly favorable fertilizer/grain price ratio in Mexico compared with other countries (table 30). 5/

*Tractor* draft power increased significantly during the seventies, in part because of lower prices relative to farm product prices (table 31). Farmers owned about 173,000 tractors in late 1980, about 27 percent above the number owned in 1976 (table 32). Over the same period, the number of work animals increased by roughly the same percentage and by 1980

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5/ The 1981 data for phosphate fertilizers show Mexican producers to have a similar price advantage in relation to the United States and other countries. The Government stimulated the consumption of fertilizer, which doubled between 1970 and 1980, to an average of 58 kilos per hectare [47].

totaled 9.6 million head (the equivalent of 25-30 percent of the total tractor power used in agriculture). The existing stock of tractors and draft animals averaged about 1 horsepower (hp) per hectare of cultivated area, according to the 1970 Census of Agriculture; but tractor supply varied widely, with shortfalls greatest in the southeast. Half of the nation's farmers used their own draft animals as the main source of power, 25 percent of the farmers owned tractors, and the remaining 25 percent depended on animals or tractor custom services.

*Diesel* fuel prices (nominal terms) remained unchanged for many years. But in constant terms, diesel prices declined 60 percent from 1965-80. In late December 1981, the nominal price of diesel fuel increased to 2.5 pesos per liter, and in mid-1982, the price reached 4 pesos per liter, bringing the real price of diesel up to approximately the real rate that prevailed in 1965 [69]. In mid-1981, diesel prices were about 15 percent of those in the United States.

*Seed* prices for almost all basic grains are regulated by the Government from production through distribution. With regard to market prices for grains, improved seed prices fell slightly in 1981 (table 33). However, no persistent trend in the relationship has developed, even though the quality of the seed supply has improved significantly through the years.

Area planted with certified seed for rice, wheat, and dry beans increased during the seventies, reaching 58, 86, and 23 percent, respectively, as a share of cultivated area by 1978. All of cotton, soybean, safflower, and sorghum are planted with improved seeds. Only 18 percent of the harvested area of corn,

Table 29--Indexes of input and product prices  
(1950=100)

Year	Index of nominal product prices			Index of nominal input prices		
	Crops	Livestock	Total	Crops	Livestock	Total
1950	100.0	100.0	100.0	100.0	100.0	100.0
1960	162.5	184.8	171.0	142.5	192.7	164.7
1970	212.2	238.4	222.8	230.3	190.0	135.8
1975	422.2	467.0	441.3	214.3	436.2	331.0
1980	1,053.7	1,060.7	1,056.6	566.6	1,003.0	799.1

Source [49].

however, was planted with certified seed in 1978 [47].

*Farm credit* comes from both public and private institutions. Credit from private institutions goes mostly to private farmers because *ejidatarios* and most of the *comuneros* cannot offer their land as collateral (since the Government holds title to the land). Private institutions provided about 25 percent of the credit allocated for crops in 1976, but by 1981 (with the SAM's high price supports in place), that amount rose to 37 percent. Private institutions, however, have always provided 75-80 percent of the credit needs of the livestock sector [69].

Table 30--Relative cost of purchasing fertilizer in terms of farm product

Country and year	Corn	Wheat	Cotton
<u>Kilograms 1/</u>			
Mexico:			
1973	3.07	4.23	0.26
1978	2.01	1.39	.21
1981 2/	2.11	.99	.10
United States:			
1973	2.10	2.34	.20
1978	4.17	3.39	.29
1981	3.12	2.33	.20
World:			
1973	1.35	1.93	NA
1978	4.09	3.73	.34
1981	3.85	2.78	.25

NA = not available.

1/ Kilograms of product required to pay for 1 kilogram of nitrogen fertilizer.

2/ These figures do not reflect a provision in the SAM production incentive program which made fertilizer available to farmers at a 30-percent discount if used for basic grains. For rain-fed land, no limit existed on the amount of area per farm which qualified for the discount. For irrigated land, the limit was 20 hectares per farm.

Table 31--Relative cost of purchasing farm tractors in terms of wheat

Year	Tractor horsepower		
	67 hp	89 hp	120 hp
<u>Tons 1/</u>			
1975-78 (average)	88	173	200
1979	95	241	306
1980	90	142	159
1981	64	101	118

1/ Tons of wheat required to purchase a farm tractor.

Credit provided by public institutions is organized by the Bank of Mexico through what is known as the FIRA (Funds Established in Relation to Agriculture). Funds are channeled through BANRURAL, which makes short-term loans available to *ejidatarios*; the National Foreign Commerce Bank (Banco National de Comercio Exterior), which finances exports; the National Agricultural Insurance Agency (ANAGSA), which makes loans available for crop insurance; and others. BANRURAL's rates vary according to the type of borrower (cooperative or individual), type of enterprise, and income. In light of Mexico's recent high inflation rate, real interest rates for these loans have generally been negative.

Irrigation districts administered by SARH account for a substantial portion of irrigated farming. Water charges, seldom volume-related, have been levied on users at rates substantially below the cost of providing the service.

Table 32--Tractors, draft animals, and horsepower on farms, 1972-80

Item	1972-76 average	1977	1978	1979	1980
<u>Thousands</u>					
Draft animals	7,726	9,302	9,442	9,465	9,643
Tractors	126	141	150	161	173
<u>1,000 horsepower</u>					
Animal power 1/	3,863	4,651	4,721	4,733	4,822
Tractor power	8,832	10,205	10,897	11,698	12,630
Total power	12,695	14,856	15,618	16,413	17,452

1/ Estimated on the basis of 0.5 horsepower (hp) per horse, mule, or ox.

Source: [48].

Table 33--Relative cost of purchasing improved seed in terms of grains

Year	Beans	Corn	Wheat	Sorghum
<u>Kilograms 1/</u>				
Average:				
1966-70	2.10	3.19	2.25	7.68
1971-75	1.82	3.98	2.02	6.79
1976-79	2.22	4.15	2.09	8.97
1980	3.00	4.27	2.39	7.59
1981	2.25	3.66	1.82	5.60

1/ Kilograms of product required to pay for 1 kilogram of improved seed.

Between 1960 and 1973, the latest year for which data are available, the Government subsidized between 30 and 76 percent of total irrigation costs in federal irrigation districts. During 1970-73, the Government absorbed an average of 42 percent of the credit costs [49]. Since farmers in the federal irrigation districts are among the richest in Mexico, the de la Madrid administration is considering eliminating much of this subsidy.

### Consumption Policies

Regulation of retail prices of "the Mexican basket of basic commodities" is carried out by the Government through CONASUPO. Corn products (principally tortillas), wheat flour, beans, sugar, rice, bread, milk, and vegetable oil are among the basic items.

For many years, retail prices of basic commodities have been kept at low levels (price ceilings vary for different locations). This was justified originally as assistance to poor families. Over the past decade, prices of many agricultural commodities deemed essential to the diet of the poor, like tortillas, milk, and eggs, grew more slowly than the consumer price index because of CONASUPO's extensive intervention in the market (table

34). CONASUPO subsidies grew from \$554 million in 1980 to more than \$1.9 billion in 1984.

CONASUPO provides subsidies all along the marketing chain for these basic commodities to the extent that marketing margins are typically negative. This means that, in addition to price controls, the Government also has control over marketing costs. The Government purchases a portion of domestic agricultural production and most imports of basic commodities, owns and operates processing plants, and operates an increasingly important network for distribution and retail sales. The present administration hopes to reorganize consumption subsidies so that they reach target groups more efficiently and effectively through PRONAL.

### Trade Policies

The principal objective of Mexico's overall trade policy is to avoid emulating the import-dependent economies of so many of the world's major oil-exporting nations. Another major policy concern is to diversify Mexico's trade relationships and become less dependent on the United States as a supplier and a market.

Table 34--Mexican retail price indices for selected commodities

Item	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
<u>Index (1970 = 100)</u>											
Consumer price index	100	105	110	123	153	176	204	263	309	365	462
Rice	100	104	105	187	247	251	286	296	320	406	NA
Corn	100	102	106	149	195	254	254	347	353	432	NA
Tortillas	100	100	104	143	176	225	266	290	290	334	NA
Wheat	100	100	102	123	161	187	220	265	298	na	NA
Wheat flour	100	100	101	106	163	214	240	265	314	324	NA
Vegetable oil	100	102	102	145	199	198	230	248	289	326	NA
Beef	100	112	121	152	178	193	207	274	350	470	513
Pork	NA	NA	100	127	159	169	190	252	300	371	399
Poultry	NA	NA	NA	100	121	136	151	193	237	280	319
Eggs	100	100	100	108	111	135	141	163	190	218	221
Dry beans	100	90	94	154	215	192	218	224	315	392	NA
Unpasteurized milk	100	109	113	128	168	172	226	268	285	373	NA
Pasteurized milk	100	100	105	128	161	165	221	274	279	343	NA
Powdered milk	100	100	121	123	159	200	219	272	332	NA	NA

NA = not available.

Sources: [16, 51, and 63].

Until recently, CONASUPO, a semi-autonomous governmental organization, was the sole authorized importer of most grains, oilseeds, and dairy products. Private millers, processors, and livestock producers relying on imported feedstuffs complained about inadequate and ill-planned imports.

CONASUPO had followed a policy of purchasing a third of its needs directly from foreign governments, another third through public tenders, and the final portion through contractual arrangements. Now import decisions are made by a committee that includes CONASUPO and other governmental and private industry representatives, but the Government maintains control on the final import decision. CONASUPO continues to give preference to government-to-government transactions, but no longer has predetermined limits on its use of public tenders.

CONASUPO continues to issue the tenders for grains and oilseeds, at times on behalf of importers [32]. 6/

Mexico's agricultural import policy is based on its goal to provide the basic necessities of life to its population. While it aims to establish self-sufficiency in the production of basic foodstuffs, starting with corn and beans, the Government has acknowledged its need to import these goods until domestic production is sufficient. This includes mostly grains, oilseeds, tallow, lard, and nonfat dry milk. In January 1980, the Mexican Government sought an agreement with the United States that would more formally recognize the purchases that the Mexicans needed to make from the United States. Since then, three such agreements have been signed. Through these agreements, the Mexican Government hopes to assure the people that supplies of basic foods will be available.

For nonbasic commodities, products competitive with those produced in Mexico or considered luxury items, imports into Mexico are very restricted. Horticultural products, canned foods, nuts, and specialty items are often not granted the required import permit and are thus kept out of the country. For

6/ Private importers of oilseeds and grains are now allowed to import for their own account as long as an import license is granted by the Commerce Secretariat (SECOFIN).

many products, separate and more lenient import requirements exist for the border areas so as not to encourage Mexican border residents to purchase food in the United States.

Mexican import tariffs tend to be high, compared with those imposed by developed countries. However, they are not out of line with those generally found in the developing world. Mexico has not been a member of GATT (the General Agreement on Tariffs and Trade) and was thus not subject to the disciplines required by that international trading institution. Thus, Mexico often adjusted its import duties or licensing requirements without prior consultation with its suppliers, and also without obligation to compensate for any trade impairment that may result. Nonetheless, in light of its present economic situation, the Mexican Government has begun to liberalize import and export restrictions in the hope that markets will open up for their exports. Furthermore, it has recently applied for GATT membership.

Mexico has been one of the few countries using an official price system for some of its duty valuations. "Official" prices, which often have little relation to actual market values, serve as the basis for calculating *ad valorem* duties. In most cases, the "official" prices are substantially higher than actual invoice prices. Mexico does not accept actual invoice prices unless they are higher than the official price. This results generally in tariffs that are higher than the stated rate. In July 1979, many items were exempted from this practice. However, the official valuation system has been maintained for use on imports of items that are produced in Mexico, items that are exempt from import licensing, and luxury goods not produced in Mexico [32].

Many agricultural exports from Mexico require licenses and are subject to export taxes. For some items, like coffee, licensing is often used to restrict exports until domestic needs have been met and domestic price objectives obtained. However, for horticultural products, achieving domestic price objectives does not seem to be as important as avoiding import restrictions that could be imposed if U.S. growers feel threatened by excessive imports from Mexico. Exported tomatoes must meet quality and grade standards established by the Mexican Horticultural Producers Union. These

standards are almost always more stringent than those imposed by U.S. marketing orders, which apply to imports as well as U.S. production.

Exports of beef and live cattle from Mexico are also closely controlled to maintain a balance between filling export commitments and assuring adequate beef supplies for a growing domestic market. Through licensing, beef exports have been effectively restricted since early 1979 in response to perceived shortages on the Mexican market [32].

Mexico is a member of the Latin American Integration Association (LAIA), the successor of the Latin American Free Trade Association (LAFTA). It grants preferential duty rates on specified imports from member countries and at times also waives the licensing or official valuation requirement. Although Mexico is a member of LAIA, its trade with other LAIA countries has not expanded noticeably despite frequent proclamations to shift away from U.S. dependence.

U.S.-Mexican agricultural trade relations are complicated by the fact that Mexico is variously a major supplier of complementary products to the United States; a stiff competitor for some commodities produced within the United States; and, particularly in recent years, a principal market for U.S. farm exports. On the other hand, Mexican import restrictions for basic products differ considerably from those for competitive products, further complicating the trade relationship. There is thus no overall trading relationship; instead, the relationship depends on the type of products involved.

#### FUTURE FARM PRODUCT DEMAND

Mexico's economic conditions are expected to improve only slightly over the next few years (see appendix for projection assumptions). We anticipate little growth in per capita consumption of animal protein, and lower income groups are expected to shift from beef and pork to lower priced viscera cuts and variety meats. Nonetheless, those born 10-15 years ago, when Mexico's population growth rate exceeded 3 percent per year, are now entering their peak caloric consumption years. Total consumption levels are thus expected to increase.

Because several factors are expected to converge to slow domestic livestock production, the growth in demand for feed grains and protein meal is expected to slow. Per capita human consumption of corn, dry beans, wheat, rice, and vegetable oil will grow less rapidly in the near term than during the seventies because of higher real prices, given the Government's inability to subsidize consumption as much as during the seventies. Again, however, total consumption of these commodities will grow because of population increases.

#### Food Consumption Patterns

Mexicans spend a large proportion of their income on food. The 1977 National Survey of Income and Household Expenditure found that nearly 45 percent of Mexico's total national household monetary expenditures were on food and beverages. The survey also found that although lower income groups spent a larger percentage of their income on food than higher income groups, higher income consumers spent far more in absolute terms on agricultural commodities. This reflects the tendency for the higher income classes to consume not only greater quantities of food, but also more costly items like meat, milk, corn, wheat, vegetable oil, and sugar.

Although expenditures on corn amounted to only 10 percent of the average household's food budget, corn is by far the principal component of the Mexican diet (table 35). Corn is the primary source of both calories and protein for Mexico's poor. Corn, dry beans, chilies, tomatoes, and onions constitute the traditional Mexican diet. Wheat consumption grew rapidly in recent decades, paralleling the rapid rise in production due to the successful adoption of high-yielding wheat varieties. Wheat is consumed mostly by higher income urban consumers. Rice is most popular in the Gulf region, where it is produced.

Per capita consumption of livestock products is moderate in Mexico. For example, per capita yearly consumption levels for beef and poultry were 16 and 6 kg, respectively, in 1979-81. By comparison, Brazilians consumed 18 kg of beef and 9 kg of poultry; Venezuelans 22 kg of beef and 15 kg of poultry; and U.S. consumers, 35 kg of beef and 23 kg of poultry. Consumption of beef, pork, and eggs expanded

quite rapidly in the seventies, while per capita consumption of poultry and milk grew very little.

The Mexican appetite for sugar, at 43 kilos per person per year, is one of the highest in the world. Mexicans get most of their sugar in the form of soft drinks. Government policy encouraged sugar consumption since it is a major source of calories for some segments of the population. Mexico exported sugar through the early seventies; but by 1981, refined sugar imports had become one of the costliest items of Mexico's food import bill. Mexico has recently returned to self-sufficiency in sugar after several years of imports.

One Government survey revealed that 35 million Mexicans fell short of minimum daily nutritional requirements of 2,750 calories and 80 grams of protein. Of this 35 million, 13 million rural dwellers and 6 million urban dwellers were malnourished [44]. A recent study by the Food and Agriculture Organization of the United Nations, however,

estimates that the average Mexican diet is above world and Latin American levels in terms of calorie and protein intake [20].

### Trends and Projections for Major Commodities

Because livestock production has been hampered by land tenure restrictions, chronically high feed prices, and fundamental infrastructure problems, Mexico has changed over the past decade from a net exporter of livestock (principally feeder cattle and beef) to an importer. Although Mexico is still a moderate exporter of feeder cattle, it now imports large amounts of nonfat dry milk and increasing amounts of eggs, broilers, tallow, hides, live slaughter cattle, and pork. Imports of inputs such as breeder cattle and hatching eggs have grown substantially over the past decade as well. Except for nonfat dry milk, which is mostly supplied by Ireland, the United Kingdom, and Canada, Mexico purchases nearly all of its livestock imports from the United States.

### Livestock and Products

*Beef* traditionally has been the principal meat in the Mexican diet as well as a large export earner. However, its dominance has declined in relation to other major livestock products over the past two decades, and pork production surpassed beef carcass output in the seventies.

The beef industry, with notable exceptions, has not undergone the radical changes of other livestock enterprises. Unlike the movement toward confined feeding and modern production systems common with poultry and swine, most Mexican cattle continue to be produced under traditional land-extensive production systems. As a result, beef production remains highly dependent on weather and corresponding conditions of pasture and range.

The Mexican Government has become increasingly concerned about the ability of the Mexican beef cattle industry to supply the domestic market with sufficient quantities of beef at a reasonable price. The northern regions of Mexico have historically exported feeder cattle to the United States due to the type of cattle operations there and the

Table 35--Per capita daily consumption of calories and proteins, 1979-81 average

Commodity	Consumption
	Grams/day/person
<b>Calories from:</b>	
Corn and products	328.9
Wheat products	122.8
Rice	21.9
Dry beans	41.5
Tubers	37.5
Vegetables	86.6
Fruits	251.0
Beef	23.1
Pork	18.3
Poultry	17.4
Mutton/goat	4.9
Eggs	21.7
Milk	214.7
Cheese	3.9
Lard	1.9
Seafood	28.8
Vegetable oil	25.6
Sugar	118.4
<b>Total calories</b>	<b>2,890.0</b>
<b>Total protein</b>	<b>75.0</b>

Source: [20].

geographic closeness to U.S. markets. To prevent shortages in Mexico's domestic beef market, the Government implemented live cattle export controls (quotas) and beef exports have been suspended since 1979 [32]. In fact, in the late seventies and early eighties, Mexico was forced to import beef cattle for slaughter and beef carcasses from the United States, Guatemala, and Costa Rica in order to satisfy domestic demand. 7/

Although retail beef prices rose more rapidly than several of the basic food products in the seventies (table 34), per capita consumption increased appreciably. Consumption gains are projected to slow measurably through the midnineties, actually declining in the late eighties (table 36). Behind this departure from trend is the fact that Mexico's calf crops are expected to be small for the next 2-3 years. In addition, beef production is expected to be constrained by prohibitively high costs of imported inputs (such as breeding cattle, feeding supplements, medicines) and limited access of producers to foreign exchange.

During this rebuilding phase of the cattle cycle, domestic supplies of beef are expected to fall below 1982 levels and prices will rise. Even with a reduced growth in income, the income elasticity for beef is sufficiently high so that consumption could exceed projected production levels. Since the foreign exchange situation is unlikely to improve enough to

7/ According to some sources, beef imports from Guatemala and Costa Rica were arranged at the presidential level to allow for payment of petroleum purchases.

Table 36--Beef supply and utilization

Item	1969-71		1979-81		Projections	
	average	average	1987	1992	1987	1992
<u>1,000 metric tons</u>						
Production	568	1,048	1,133	1,365		
Consumption <u>1/</u>	519	1,049	1,156	1,435		
Net trade <u>2/</u>	41	-1	-22	-69		
<u>Kilograms/year</u>						
Per capita consumption	10.9	15.5	14.3	15.9		

1/ Assumes an increase in real beef prices of 5 percent per year.

2/ Negative values indicate net imports.

sustain such imports, the Government will probably allow prices to rise and will adopt other policies to dampen demand or to restrict access of Mexicans to meat supplies. Even if the real price of beef increases by 5 percent per year, Mexico will still have to import almost 70,000 tons of beef by 1992.

Pork consumption levels are almost identical to those for beef and have been for more than a decade, even though pork prices rose less than beef prices. Despite substantial production gains made in the seventies, pork consumption grew so much that Mexico imported more and more pork and pork products. Imports are primarily edible offals, lard, skins, and variety meats, which all play a significant role in the diet of a large segment of the populace. Mexico has also begun to import live animals, particularly breeding stock. Nearly all of these imports come from the United States. Despite the need to import, Mexico also exports some pork products, chiefly special cuts destined for Japan and, occasionally, the United States (but not since 1979).

Pork consumption is expected to exceed production through 1992 (table 37). A decline in real incomes in the short run will constrain per capita consumption because of pork's high income elasticity. For the same reason, per capita consumption will accelerate as the economy expands in the early nineties. Growth in pork production is presumed to follow a 4-6 year cyclical pattern of expansion and contraction with the next peak expected in 1988-89. As with beef, current trends in consumption and current prices would cause

Table 37--Pork supply and utilization

Item	1971-73		1979-81		Projections	
	average	average	1987	1992	1987	1992
<u>1,000 metric tons</u>						
Production	522	1,052	1,190	1,476		
Consumption <u>1/</u>	525	1,064	1,208	1,505		
Net imports <u>3/</u>	3	12	17	28		
<u>Kilograms/year</u>						
Per capita consumption	10.7	15.8	15.0	16.7		

1/ Assumes an increase in real pork prices of 2.5 percent per year.

pork consumption to exceed projected production by 67,000 tons in 1992. The drain on foreign exchange from such large imports of pork will likely prompt the Government to restrict imports and to raise pork prices. A price increase of about 2.5 percent per year would hold imports to a more acceptable level of about 28,000 tons.

Poultry meat production for most of the seventies was sufficient to meet domestic demand. However, in recent years Mexico has been forced to turn to the foreign market to alleviate seasonal or regional shortages. Most of Mexico's poultry imports have been fertilized eggs and live birds for breeding.

Poultry meat production is expected to increase by just under 3 percent per year through 1992 (table 38). Due to poultry's high income elasticity, per capita consumption is projected to expand in the early nineties. Because the poultry industry can respond quickly to changes in demand, Mexico will face a rough balance between production and consumption and not likely have to import poultry meat until the late nineties. By 1992, Mexico will need to import about 36,000 tons of poultry meat to make up for seasonal and regional shortages.

Egg production was sufficient to satisfy domestic demand during most of the seventies; Mexico even exported sizable quantities of eggs in 2 years. By the end of the decade, though, Mexico's imports of both hatching eggs and fresh eggs for human consumption were increasing. By the early eighties, Mexico was including eggs in the U.S.-Mexican trade agreements to reinforce its intent to assure sufficient domestic supplies.

Table 38--Poultry meat supply and utilization

Item	1973	1979-81 average	Projections	
			1987	1992
1,000 metric tons				
Production	264	371	438	520
Consumption	268	380	436	556
Net trade <sup>1/</sup>	-4	-9	2	-36
Kilograms/year				
Per capita consumption	5.0	5.6	5.4	6.2

<sup>1/</sup> Negative values indicate net imports.

The Government will probably continue its extensive intervention in the egg industry to hold down costs of this source of protein for the poor. Retail price increases will probably continue to lag behind increases in production costs. For that reason, the gap between production and consumption is expected to expand in the late eighties (table 39). Like other livestock products, per capita egg consumption is expected to fall in the near term because of the effects of a high positive income elasticity and contracting per capita incomes. By the early nineties, increases in per capita consumption are foreseen because of an expected upturn in the economy. Mexico could again be self-sufficient in eggs if the Government permitted producer prices to increase in line with general inflation. But if Government policies continue to reduce the real price of eggs by 2 percent per year, Mexico will have to import approximately 76,000 tons of eggs by 1992.

Milk is an important part of the Mexican diet. Attempts to keep prices low have resulted in shortages of domestic milk and regional and seasonal shortages contributed to a continual dependence on large quantities of imported milk and other dairy products.

Mexico produced about 90 percent of the milk it consumed at the beginning of the seventies, but was only 80 percent self-sufficient by the end of the seventies. This gap is expected to widen further (table 40). Per capita consumption rose by about 10 percent during the seventies, while retail prices increased much less than food prices or the general inflation rate. If the Government continues to subsidize milk consumption in the same

Table 39—Egg supply and utilization

Item	1969-71 average	1979-81 average	Projections	
			1987	1992
1,000 metric tons				
Production	326	638	679	799
Consumption <sup>1/</sup>	329	688	746	876
Net imports	3	50	67	77
Kilograms/year				
Per capita consumption	6.7	10.2	9.2	9.7

<sup>1/</sup> Assumes real price decreases of 2 percent per year.

fashion as in the seventies, Mexico would need to import about 3.8 million tons of fluid milk (equivalent to approximately 325,000 tons of nonfat dry milk) by 1992. If instead, the Government allows real milk prices to rise by 0.5 percent per year, consumption will be dampened such that imports of approximately 3.3 million tons of fluid milk (equivalent to 275,000 tons of nonfat dry milk) would be necessary.

### Grains and Legumes

Corn consumption by humans has been growing at about 3.5 percent per year since 1969-71 and averaged 10.4 million tons in 1979-81. Little corn was fed to livestock during the sixties, but by the late seventies, feed use accounted for about 20 percent of total consumption. Virtually all feed corn was imported.

Corn area is expected to expand rapidly during the eighties because of import substitution policies. The urge to lessen dependence on

foreign supplies is expected to prompt the Government to provide added incentives to producers. With the recent emphasis on production in rain-fed areas, yields are expected to grow slowly as the area expands on lower yielding land.

Human consumption is expected to expand in line with population increases. The Government's predilection for subsidizing consumption would offset the expected decline from a slightly negative income elasticity in combination with moderate income growth (table 41). The gap between domestic corn production and consumption is therefore expected to widen through the eighties, as production lags behind population growth and as corn used for animal feed increases. However, little is expected to be lost in the degree of self-sufficiency.

Dry beans are also an integral part of the Mexican diet. Per capita consumption diminished over the seventies principally because the Government chose not to import significant amounts of dry beans until 1980, even though production was declining and drought years brought shortages.

Per capita consumption is expected to remain steady through the early nineties. However, the gap between production and total consumption will widen (table 42). A very slight increase is projected for the bean area, but by 1992 the area harvested will still be below the 1969-71 average. A slight increase in yield growth is projected as well. Few modern inputs are presently used by most dry bean producers, so the potential for yield growth through the use of modern technology remains large.

Table 40--Fluid milk supply and utilization

Item	1969-71 average	1979-81 average	Projections	
			1987	1992
1,000 metric tons				
Production	5,296	7,028	7,471	8,248
Consumption 1/	5,578	8,507	9,594	11,502
Net imports	282	1,479	2,123	3,254
Kilograms/year				
Per capita consumption	113.9	125.9	119.0	127.6

1/ Assumes an increase in real price of milk to consumers of about 0.5 percent per year.

Table 41--Corn supply and utilization

Item	Units	1969-71 average	1979-81 average	Projections	
				1987	1992
Area harvested	1,000 ha	7,750	7,950	8,377	8,696
Yield	mt/ha	1.0	1.3	1.4	1.6
Production	1,000 mt	8,138	10,433	12,179	13,620
Food consumption	do.	7,408	10,400	12,304	13,659
Feed consumption	do.	136	2,600	3,105	3,989
Net trade 1/	do.	594	-2,586	-3,230	-4,028
Per capita consumption	kg/yr	151.2	153.9	152.6	151.5

1/ Negative values indicate net imports.

Dry beans is one of the few commodities for which Mexico could achieve self-sufficiency. Very little would be required for incentives, as was demonstrated by the production response to the SAM program in 1982. The response was so great that Mexico actually exported small amounts of beans, although the country remained a net importer. In the absence of such incentives, Mexico will probably import about 180,000 tons yearly by 1992.

Wheat is another important grain consumed in Mexico, used mainly in bread and pastries. Total wheat consumption has expanded by about 5.2 percent annually since the early seventies to average 3.5 million tons by 1980 (table 43). Only about 5 percent of the wheat is used for animal feed.

Growth in per capita consumption during the eighties is expected to be about half of what it

was in the seventies. Wheat consumption per person will grow very slowly through the eighties and will peak by 1990. Nonetheless, total consumption will increase by more than 3 percent annually because of population growth. The difference between production and consumption is expected to grow as there is little room for improvement in yields, and expansion in area is limited by the availability of irrigation water. Imports of nearly 1.4 million tons may be needed by 1992.

Rice is consumed mainly in the urban areas by upper middle and higher income groups. Rice consumption expanded by about 3.2 percent annually since 1969-71 to an average 364,000 tons by 1979-81 (table 44).

Area expansion will probably increase more rapidly than in the seventies because of plans to encourage rice production in the Gulf

Table 42--Dry bean supply and utilization

Item	Units	1969-71	1979-81	Projections	
		average	average	1987	1992
Area harvested	1,000 ha	1,967	1,733	1,795	1,840
Yield	mt/ha	0.5	0.6	0.6	0.7
Production	1,000 mt	1,000	985	1,122	1,239
Consumption	do.	1,027	1,040	1,230	1,421
Net imports	do.	27	55	108	182
Per capita consumption	kg/yr	21.0	15.4	15.3	15.8

Table 43--Wheat supply and utilization

Item	Units	1969-71	1979-81	Projections	
		average	average	1987	1992
Area harvested	1,000 ha	747	737	876	991
Yield	mt/ha	2.7	3.6	3.8	4.0
Production	1,000 mt	2,032	2,664	3,367	3,980
Food consumption	do.	2,097	3,483	4,218	5,097
Feed consumption	do.	72	150	200	257
Net imports	do.	137	969	1,051	1,374
Per capita consumption	kg/yr	42.8	51.6	52.3	56.5

Table 44--Rice supply and utilization

Item	Units	1969-71	1979-81	Projections	
		average	average	1987	1992
Area harvested	1,000 ha	152	157	180	199
Yield	mt/ha	1.7	2.3	2.4	2.5
Production	1,000 mt	258	364	433	490
Food consumption	do.	279	380	450	524
Net imports	do.	21	16	17	34
Per capita consumption	kg/yr	5.8	5.6	5.6	5.8

region, where there is more abundant rainfall and spring flooding that can be used to advantage. But as this shift occurs, national yields are expected to grow more slowly because yields will be lower in the Gulf region than in the irrigated areas of the Pacific North.

With limited income growth and a low elasticity of demand for rice in Mexico, per capita consumption is not expected to expand significantly through the early nineties. Rather, total consumption will grow primarily as a function of population growth. As a result, the gap between projected production and consumption will not widen substantially.

*Sorghum* consumption is expected to grow by more than 50 percent over the forecast period chiefly because of expected increases in milk and egg production and the increased use of confined feeding of hogs. Despite anticipated yield and area increases, Mexico's import needs will be a million tons larger in 1992 than they were in 1979-81 (table 45).

#### Oilseeds and Products

*Soybeans*, along with sesame and safflower, were singled out from all of Mexico's oilseed crops for special attention in the SAM program. However, expansion of soybean production will be limited by available water supplies in northwest Mexico. Frequent droughts, combined with the heavy irrigation requirements of the winter wheat crop, caused major fluctuations in soybean production throughout the seventies in contrast to Mexico's steadily increasing soybean consumption. For example, during the 1980/81 crop year, soybean production plummeted 60 percent while consumption grew by more than 10 percent. Since no new massive irrigation

projects will probably be undertaken by the Government in the eighties, the soybean area will probably expand only moderately at best (table 46). The Government has programmed an expansion of soybean area in the rain-fed areas of northeast Mexico, but yields obtained there will probably be much lower than the current national average.

Mexico has had a considerable amount of excess crushing capacity in recent years and, given present expansion plans of the processing sector, this excess crushing capacity will increase throughout the eighties. The oilseed-processing sector, therefore, is constantly pressuring the Government to limit imports of finished products. The Government is generally receptive to this request because oilseed imports cost less than imports of vegetable oils and meal. Therefore, Mexico will probably import oilseeds rather than their finished products as much as possible.

*Cottonseed* production is projected to drop by 1992. Government incentives directed at spurring production of basic food crops placed cotton at a disadvantage in the competition for the limited irrigation water over the past few years. Low world market prices in combination with the rising cost of both labor and pesticides also discouraged production in the late seventies.

*Safflower* production is expected to grow much more slowly than in the seventies. Safflower competes with winter wheat grown in the irrigation districts of the Pacific North. When water supplies are plentiful, farmers typically grow a winter wheat-soybean combination; in drier years, they produce safflower only. Significant area expansion would have to be tied to expanded

Table 45—Sorghum supply and utilization

Item	Units	1969-71	1979-81	Projections	
		average	average	1987	1992
Area harvested	1,000 ha	913	1,133	1,347	1,524
Yield	mt/ha	2.5	2.8	3.2	3.5
Production	1,000 mt	2,246	3,266	4,310	5,305
Feed consumption	do.	2,216	5,367	6,510	8,364
Net trade <sup>1/</sup>	do.	30	-2,101	-2,200	-3,059
Per capita consumption	kg/yr	44.9	48.4	53.5	58.9

<sup>1/</sup> Negative values indicate net imports.

Table 46--Oilseed production

Item	Units	1969-71	1979-81	Projections	
		average	average	1987	1992
<b>Soybeans:</b>					
Area harvested	1,000 ha	148	248	347	440
Yield	mt/ha	1.8	1.7	1.8	1.8
Production	1,000 mt	271	430	624	814
<b>Cottonseed:</b>					
Area harvested	1,000 ha	563	363	339	322
Yield	mt/ha	1.4	1.6	1.6	1.6
Production	1,000 mt	774	576	544	523
<b>Safflower:</b>					
Area harvested	1,000 ha	130	387	415	436
Yield	mt/ha	1.2	1.4	1.4	1.4
Production	1,000 mt	162	521	566	601
<b>Other oilseeds: 1/</b>					
Production	1,000 mt	249	281	294	302

1/ Copra, sesame, and sunflower seed.

irrigation areas, which is not anticipated in the eighties. Yields are already among the highest in the world, so growth there is limited as well.

*Oilseed product consumption grew substantially during the past few years due largely to Mexico's rapid population growth and increased production of meat and dairy products (table 47). Mexico is slowly developing into a sophisticated market for fats and oils. Processed vegetable oils that have been highly refined and deodorized are preferred by consumers, who are becoming more quality conscious. This is particularly evident in major urban areas where modern retail outlets provide a variety of products containing fats and oils in different sizes and packaging materials. The present trend in consumption is toward more liquid vegetable oils for use in both commercial and household cooking and away from hardened fats such as hydrogenated shortenings and margarine [32].*

The increase in consumption of vegetable-based fats and oils in recent years has been closely related to Mexico's income and population growth. A modest increase in per capita consumption has also taken place. Per capita consumption of vegetable fats and oils rose from 7.5 kg in 1970 to 9.9 kg in 1979-81. Consumption of fats and oils is projected to grow at perhaps 3 percent annually through the rest of the eighties. Population growth will, of course, be a critical factor in

Table 47--Oilmeal and vegetable oil supply and utilization

Item	1969-71	1979-81	Projections	
	average	average	1987	1992
<u>1,000 tons</u>				
<b>Oilmeals: 1/</b>				
Production	610	938	1,160	1,383
Consumption	870	1,829	2,142	2,687
Net trade 2/	-260	-891	-982	-1,304
<b>Vegetable oil:</b>				
Production 3/	326	469	522	571
Food consumption	263	667	774	955
Industrial consumption	51	89	125	159
Net trade 2/	12	-287	-377	-544

1/ Measured in 44-percent soybean meal equivalents. Includes soymeal, cottonseed meal, safflower meal, copra meal, sunflower meal, sesame meal, and fishmeal.

2/ Negative values indicate net imports.

3/ Production is from domestically produced oilseeds.

achieving such growth. And much will depend on the introduction and success of products not now being heavily marketed such as salad dressings, mayonnaise, and spreads.

Growth in oilseed meal consumption in Mexico is tied to the steady expansion of the livestock sector and the consequent increase in the demand for balanced feed rations (see appendix). The demand for livestock products reflects population growth to some extent; but

more important, it reflects the increase in consumer incomes and the consequent demand for animal protein. Soybean meal accounts for approximately 70 percent of all oilseed meals consumed in Mexico. Almost all soybean meal is used in poultry and hog feeds. Smaller amounts of cottonseed, safflower, and sunflower meals are consumed by cattle; these oilseeds have lower protein and higher fiber content than soybean meal, making them more easily digested by cattle.

Human consumption of soybean products represents no more than 2-3 percent of total consumption. However, Government efforts to provide sufficient protein for its urban and rural poor will inevitably lead to an increase in human consumption of soy flour. Mexicans in both the private and public sectors are aware of the rapidly increasing costs of animal proteins and are looking closely at texturized soy protein and cereal foods fortified with soy protein. The distribution network of institutional facilities and retail outlets for soybean products continues to expand in major urban centers in order to handle an increased volume.

### Prospects for U.S. Exports to Mexico

What follows is a description of the trade patterns that developed over the seventies in each of the 17 food categories as delineated by the United Nations (see app. table 4 for import detail.) We also show the possibilities for increased U.S. exports of the commodities through the early nineties, whether through expanding Mexican demand or through increasing the U.S. market share.

### Primary Import Categories

*Cereals and preparations* constitute the principal component in Mexico's agricultural import bill. The United States is the major supplier of these commodities, with 83-97 percent of the market over the past decade. Canada and Argentina have been our major competitors in the past, although together their share has never exceeded 16 percent of the total. Canada, Argentina, and Australia supplied most of Mexico's imports of wheat for feed during 1983 and 1984. *Corn* imports are almost exclusively of U.S. origin with minor purchases from Argentina.

Mexico's *sorghum* imports come primarily from the United States, but as Mexico's external purchases began to increase in the late seventies and early eighties, Argentina began regularly supplying about 25 percent of Mexico's import needs. The United States regained 100 percent of the Mexican sorghum market in 1982 because it was able to offer financially strapped Mexico credit guarantees (through the GSM-102 program) which Argentina could not offer because of its own difficult financial situation. Nonetheless, Argentina supplied 15 percent of Mexico's sorghum imports in 1984.

Mexico has imported minor amounts of *rice* from the United States in the past. But in recent years, as import needs have grown, Mexico has elected to import rice from the Orient and Costa Rica because of prices.

Until recently, Mexico imported all of its *barley* (both malt and feed) from the United States. Sales totaled \$38 million in 1980, and have reached as high as \$45 million. Canada provided all of Mexico's barley imports during the 1984/85 marketing year (July-June).

The remainder of this category is balanced out by minor amounts of wheat flour, nonwheat flour, prepared breakfast foods, breads, biscuits and other miscellaneous products supplied almost exclusively by the United States. The most important areas of expansion lie with the major food and feed grains.

*Oilseed* imports by Mexico have been unprecedented in recent years. The value of the Mexican oilseed market quadrupled over the last half of the seventies. Two-thirds of this category is *soybeans*. The United States typically supplies 70-100 percent of Mexico's soybean imports, with the balance being provided by Brazil or Argentina. The United States is the sole supplier of Mexican *cottonseed* and *sunflower* imports, which mushroomed in the early eighties. Canada's share of Mexico's oilseed market consists of approximately \$8 million of *linseed* and *rapeseed* exports.

Mexico has negotiated with both Brazil and Argentina to import soybeans and sunflower seed in recent years to diversify its sources of supply and to reduce its dependence on the

United States. Nevertheless, the United States will probably continue to be the dominant supplier of oilseeds to Mexico through the eighties. The Mexican oilseed-crushing industry prefers U.S. oilseeds because of their high oil-yielding characteristics and quality consistency.

Mexico has been willing to pay higher prices for Argentine and Brazilian soybeans to diversify its sources of supply. If one considers the quality difference between South American and U.S. soybeans, the price difference is even greater. The most likely conclusion to be drawn is that Mexico, for political or other reasons, will allocate a percentage of its annual oilseed import requirements to non-U.S. origins. Nonetheless, Mexico will still have to look to the United States for 80-90 percent of its total oilseed import needs. For meal and oil imports, Mexico will continue to rely almost exclusively on the United States.

*Live animal* imports by Mexico did not grow significantly in the last half of the seventies. *Cattle* are the main component of this category, with the United States supplying 65 percent and Canada 35 percent. Canada has long supplied Mexico with most of its imported dairy cattle, principally Holsteins. The United States sells Mexico nearly 100 percent of its imports of sheep, goats, swine, and poultry.

The prospects for increasing U.S. sales of live animals are not promising in the near term, given Mexico's recent devaluations and foreign exchange shortages. However, as Mexico regains its financial balance, the potential for live animal exports to Mexico could be substantial. Once the Mexican populace again begin to enjoy real increases in income, demand for protein could expand at the rapid rate of the seventies. The Government will likely prefer importing breeding animals (especially dairy cattle) rather than importing beef, pork, nonfat dry milk, and other livestock products.

*Meat and preparations* imported by Mexico more than doubled during 1975-80, with the United States providing more than 90 percent. Nearly all the meat is fresh, chilled, or frozen rather than dried, canned, smoked, or salted. The largest component of this category is *edible offals*, supplied exclusively by the

United States. Mexico's imports of *poultry meat* and *pork* usually totaled nearly \$20 million in the latter seventies; the United States was the sole supplier of these products.

The outlook for sales in this category is mixed: Mexico's purchases of low-cost variety meat and offals are expected to increase in the near term at the expense of higher priced beef and pork imports. In the longer run, however, the level of Mexican imports of meats and preparations depends on the Government's adopting the necessary measures for increasing productivity in the domestic livestock sector. Unless the Government stimulates domestic livestock production by the end of this decade, which would entail imports of numerous inputs such as breeding animals, medicines, and feed supplements, Mexico's meat imports will likely exceed the levels of the latter seventies and early eighties. A more detailed discussion of prospects for Mexico's beef, pork, and poultry import needs was presented earlier in "Trends and Projections for Major Commodities," p.34.

*Dairy products and egg* imports quintupled in value during 1975-80. The EC is the major supplier with nearly 40 percent of the market; the United States and Canada have about 30 and 20 percent, respectively. The value of Mexico's *dried milk* and *cream* imports has surpassed the \$100 million mark in recent years, with Ireland alone supplying about half.

Canada, the United Kingdom, and New Zealand are the other principal suppliers, mainly through subsidized government-to-government sales. The EC and New Zealand supply the Mexican *butter* market, worth about \$50 million in 1980.

The value of Mexico's purchases of *eggs* quadrupled over the last half of the seventies to \$4.5 million in 1980, with the United States virtually the sole supplier. The United States also supplies approximately a third of Mexico's *evaporated and condensed milk* and *cream* imports, with Canada supplying the other two-thirds, totaling about \$35 million in 1980.

Continued growth of Mexican imports depends on investment in the domestic livestock sector and the continued availability of subsidized exports from suppliers. The products in this category represent the largest opportunity (in

dollar terms) for U.S. exporters. Nonetheless, U.S. exporters are at a disadvantage with subsidized exports from the EC and Canada.

## Secondary Commodities

Mexico's total imports of nonbasic food items totaled more than \$1 billion per year in the early eighties, when an overvalued peso made these imports lucrative. The United States is the chief supplier of most of these products, which range from almonds to yeast. Mexico represents an important market for U.S. producers of these commodities, and ranks in the top 10 markets for cheese, fresh fruit, canned vegetables, inedible tallow, and cattle hides.

For nonbasic commodities, however, imports into Mexico are very restricted. Products that are considered to be competitive with those produced in Mexico (and usually the interpretation of what competes with Mexican products is very liberal) or are considered luxury items, such as canned foods, nuts, and specialty items, are often not granted the required import permit and thus kept out of the country. For example, peaches and cherries are usually granted entry only if they are being imported as a complement to Mexican fruit for further processing in fruit cocktail or for juice. Mexico has been an important customer for U.S. hides and skins only because they are later re-exported as leather products.

Many of these minor commodities, which show up in U.S. trade statistics as exports to Mexico move, in fact, into the so-called "free zones" along the U.S. border. For many products, separate and more lenient import requirements exist for the border areas. These imports are allowed in order to encourage Mexican border residents to purchase food in their own country and to supply the restaurants and hotels that cater to millions of tourists each year.

*Fruit and nut* imports rose from \$11 million in 1976 to \$23 million in 1980. The United States is the major supplier with 81 percent of the market. Brazil is our major competitor with approximately 10 percent. Most of this category is fresh fruit, with *apples* being the most important component (\$4 million in 1980). The United States supplies nearly all of

Mexico's fresh fruit imports which, besides apples, include small amounts of *oranges*, *lemons*, *grapefruit*, *grapes*, and *pears*.

The United States supplies approximately half of Mexico's imports of *nuts*, valued at about \$7 million in 1980, with Brazil and Spain providing the rest. *Dried and preserved fruit* imports together account for about \$7 million, with about 98 percent of Mexico's purchases coming from the United States. Prospects for significantly expanded sales in this category are not bright. Since the Mexican Government holds that nearly all items in this category compete with domestic production or are luxury items, imports will probably be restricted to the border areas where they are presently confined. Any concession by the Mexicans in this regard would likely have to be accompanied by a reciprocal action by the United States regarding Mexican fresh or processed horticultural products.

*Vegetable* imports soared in value from about \$9 million in the midseventies to \$240 million in 1980. Mexico's imports of \$225 million of *dry beans*, almost all from the United States, accounted for nearly all of this increase. Prior to 1980, the value of Mexico's imports of vegetable products totaled approximately \$20 million. *Hops* was one of the principal commodities in this category; Mexico's purchases of hops averaged around \$7 million during the late seventies. Most of the hops and other fresh vegetable imports, such as *potatoes*, *tomatoes*, *roots*, and *tubers*, are supplied by the United States. Mexico's *prepared vegetable* market was worth about \$4 million toward the end of the seventies. The United States has about three-quarters of this market, with Spain supplying most of the rest. There will probably be few opportunities for U.S. exporters to expand within this category, except for dry beans.

Other possibilities appear tied to reciprocal trade agreements between the United States and Mexico. The possibility of expanding our exports of hops to Mexico would likely hinge on allowing Mexican beer greater access to the U.S. market. In the unlikely event that Mexico would ease import restrictions on U.S. potatoes, the market potential for the commodity (for processing into chips in Mexico) could be significant toward the end of

the decade, given that per capita incomes are expected to increase once again after 1985.

*Sugar and preparation* imports come chiefly from four countries, depending on whether the sugar is refined or raw. Three-fourths of this category is unrefined sugar, with the United States essentially the sole supplier (\$139 million in 1980). The remaining fourth of this category is refined sugar, supplied by Brazil (one-third), South Korea (one-fourth), and the EC (one-fourth). Nonchocolate sugar preparations and candy is a \$4 million market, with the United States essentially the sole supplier.

This category presents intriguing prospects for U.S. exporters. As recently as 1977, Mexico was a net sugar exporter. But income growth, consumer subsidies, and reduced production incentives quickly eroded Mexico's surplus production. By the early eighties, Mexico found itself with one of the highest per capita consumption levels in the world, mostly in the form of soft drinks. Sugar became one of the most costly items of Mexico's total agricultural import bill. In 1980, when world sugar prices topped U.S. domestic support prices, Mexico imported U.S. refined sugar. In subsequent years, however, the world price has dipped far below the U.S. support price, such that U.S. refiners can no longer compete with other suppliers.

Even though the Government considers sugar to be an important source of energy in the Mexican diet, it has been forced to cut back on the subsidy for sugar consumption (especially to the soft drink industry) because of skyrocketing costs. If *high-fructose corn syrup* becomes an economical alternative to sugar by Mexico's industrial consumers, U.S. exporters would likely benefit.

*Coffee, tea, cocoa, and spice* imports expanded moderately throughout the seventies, reaching approximately \$10 million in 1980. The three largest items in this category are *cinnamon* (\$4 million), *pepper* (\$2.4 million), and *chocolate* (\$1.4 million). Sri Lanka provides nearly all of the cinnamon, Brazil provides nearly all the pepper, and the United States supplies nearly all the chocolate and chocolate products. The United States also ships \$1.2 million in "other spices" to Mexico. Shipments of other

products in this category are minor. No major opportunities for U.S. exporters are foreseen for these commodities.

*Animal feeding stuffs*, which come chiefly from the United States (95 percent), more than quintupled during the last half of the seventies to reach \$100 million in 1980. Almost 70 percent of this category is U.S. shipments of *protein meals*. Almost all of the balance is *fodder*, exclusively from the United States. Imports of *fishmeal* totaled only \$226,000 in 1980; but, in the past, Mexico imported as much as \$18 million of fishmeal, principally from Peru.

The outlook for significant expansion of U.S. sales of fodders to Mexico is not encouraging. Mexico's livestock sector is expected to contract sharply over the near term, and growth in the latter half of the decade is not expected to be particularly robust, given the Government's present policies toward the livestock sector. Fodder sales may receive a boost during Mexico's drought years.

*Fats and shortening* imports declined from approximately \$25 million in the midseventies to \$20 million in 1980. Rendered pig and poultry fat account for 40 percent of this category. It is a \$12.8-million market which has not grown in recent years. The United States is the sole supplier of this product. Imports of *miscellaneous food preparations* totaled \$8.4 million, or 26 percent of this category, and *sauces and mixed seasonings* (\$4.8 million or 15 percent) have exhibited strong growth, doubling over the past 5 years. Again, the United States supplies almost all of these products to Mexico. The United States dominates most minor categories, such as soups, yeast, and vinegar. There are few opportunities for expanded sales in this category for U.S. exporters since external purchases of most of these products are allowed only within Mexico's border zones.

*Beverages and tobacco* imports tripled in the late seventies to \$70 million. France and the United Kingdom are the principal suppliers, with nearly 80 percent of the market. More than 30 percent of this category is *wine*, primarily from France and Spain. Sales of U.S. wine went from \$75,000 to \$280,000 between 1975 and 1980. The

United States is allotted but has not recently filled its quota for wine under Mexican trade regulations. About two-thirds of this category (\$48 million in 1980) represent imports of distilled alcoholic beverages from the United Kingdom and France. The U.S. share of this market has declined in recent years, and was only 1 percent (\$585,000) in 1980.

The United States supplies almost all of Mexico's unmanufactured and manufactured tobacco imports. Mexico usually imports no unmanufactured tobacco and is, in fact, a sizable exporter. Mexican imports of manufactured tobacco products, principally cigarettes, reached almost \$12 million in 1978 before falling to just under \$1 million in 1980. These imports are illegal under present Mexican trade regulations, so market opportunities for tobacco products are not expected to materialize. Even if the Mexican market for alcoholic beverages stagnates over the next few years, significant opportunities for U.S. wineries and distilleries exist through usurping part of the EC's market share.

*Hide and skin* imports, valued at nearly \$100 million in 1979, were almost exclusively from the United States. More than 90 percent of this category is bovine hides, with calf, goat, and sheep skins making up the balance. Imports of hides and skins are controlled by annual quotas of around 2 million hides. Apart from imports under quota, imports in any weight class of hides may enter freely if they are subsequently exported in leather product form. In order to stimulate growth of U.S. exports in this category, the United States would likely have to concede greater access to its market for Mexican leather and leather products.

*Natural rubber and gums* imported by Mexico exceeded \$50 million in 1980. Singapore and Indonesia together account for about 85 percent of this market. U.S. sales in this category reached \$2 million in 1980. No market opportunities are foreseen in this category since the United States does not produce these commodities.

*Textile fibers* imported by Mexico were valued at \$25 million in 1980, more than double the 1975 level. Three-fourths of this category is wool, supplied almost exclusively by Australia. The second most

important commodity in this group is cotton, purchased entirely from the United States. Mexico was a \$7.4-million cotton market for the United States in 1978, but by 1980 sales had declined to \$6 million. Sales are split almost equally between cotton linters and "cotton waste, uncombed." Mexico imports these cotton byproducts from the United States to supplement its own substantial cotton production, which it exports both in bale and textile form. Since the United States itself is a wool importer and Mexico a large cotton exporter, this category offers no major market opportunities for U.S. exporters.

*Crude animal and vegetable material* imports from the United States, worth \$50 million in 1980, have remained fairly constant over the past decade at about 75 percent. One-fourth of this category is "crude animal matter, not elsewhere specified." The United States supplies 90 percent of these products to Mexico, with Canada and the EC supplying the remainder. *Seeds* accounted for about 40 percent of the category, with the United States supplying about 90 percent of this market (worth \$18 million in 1980). *Live plants* and *bulbs* represented a \$6-million market in 1980; Spain and the United States have 58 and 38 percent of this market, respectively. Mexico's purchases of "other crude vegetable materials" totaled \$5 million in 1980; the United States and the EC had market shares of 40 and 37 percent, respectively.

Exports of seeds seem to present the best market opportunities for U.S. exporters. In 1982 the value of U.S. seed exports to Mexico rose by 23 percent over the previous year at the same time that Mexican imports in every other category were plummeting (because of the favorable 1981 harvest). Most of the increase was the result of larger sales of improved varieties of corn and sorghum seed. This trend should continue throughout the eighties, given Mexico's desire to stimulate growth in the basic grains sector.

*Animal fats and vegetable oil* imports quadrupled in value over the latter half of the seventies. The United States is clearly the major supplier with approximately 95 percent of the market. In 1980, imports totaled \$100 million. About half of this category is

tallow from the United States. U.S. sales of tallow to Mexico have nearly tripled in recent years. The United States also dominates the vegetable oil market in Mexico, which makes up almost all of the rest of this category. Mexico purchases minor amounts of olive oil from Spain, and *castor oil* and *vegetable waxes* from Brazil. Prospects for vegetable oil exports to Mexico were treated in an earlier section of this study.

## MARKETING IN MEXICO

The agricultural marketing system in Mexico is a mixture of public and private sector involvement. The Government is largely responsible for the purchase, storage, importation, and sale of basic commodities. Private enterprise is mainly involved in the commercialization of nonbasic and export commodities.

### Marketing Channels

The Mexican Government started in 1934 to regulate agricultural marketing in order to assure that low-income groups could afford to purchase the necessary foods. The major agency in marketing agricultural commodities is CONASUPO. CONASUPO was established as an autonomous agency in 1956 for that purpose, and reports to a Cabinet-level committee.

### Basic Commodities

CONASUPO purchases grains and oilseeds from producers through its rural purchasing centers at support prices set by the Government. CONASUPO and another Government agency together operate an extensive series of storage facilities, as well as grain and oilseed processing plants (table 48). CONASUPO also operates retail outlets for many "basic" products, primarily to assure that supplies at Government-suggested prices will be available in rural and urban areas. Retail prices for agricultural products considered to be basic to the Mexican diet, including flour, beans, tortillas, bread, some cooking oils, sugar, and milk, are subject to Government-imposed price ceilings [18].

An indication of the market strength of CONASUPO and the scale of its management

task can be drawn from the percentage of total supply (domestic production plus net imports) which is subject to its direct control through purchased domestic output and imports (table 49). However, Mexican producers are not required to produce certain crops nor to sell their harvest to CONASUPO. In fact, perhaps 20-25 percent of total bean and corn production and 5 percent of the output of less traditional crops, such as wheat, soybeans, safflower, and cottonseed, never enter formal market channels.

Producers may sell to nongovernment millers and processors at prices above the support levels, but the processed or semifinished products of these processors are frequently subject to maximum price controls. Eligibility for Government subsidies designed to offset the differences between the processor's costs and the ceiling price of the product can depend upon compliance with the support price for the raw commodity.

### Livestock Products

Livestock may be imported into Mexico by either private buyers or by Government agencies. Well-established private importers, including producers themselves, often travel to the United States to select and purchase livestock directly. These buyers normally have purchased U.S. cattle before and developed an ongoing business relationship with one or more U.S. cattle dealers.

The main import channels for livestock are individual ranchers, the regional *Uniones de Ganaderia* (Livestock Unions), and the *ejido* associations. Mexican ranchers buy breeding animals directly from U.S. producers, and some ranchers act as brokers and purchase animals for resale in Mexico. The livestock unions usually hold livestock auctions on a regular basis, which many U.S. producers attend to purchase feeder cattle and to meet with Mexican ranchers interested in buying breeding stock. The *ejido* associations purchase breeding animals through the Banco Rural [32].

### Exporting to Mexico's Free Zone

The Government established several free zones in 1939. These are specially designated areas into which numerous imports, considered

Table 48--CONASUPO's agencies, objectives, and infrastructure

Agency	Main objectives	Infrastructure
DICONSA	<p>Provide producers a fair price for their production.</p> <p>Minimize marketing margins of agricultural products.</p> <p>Provide consumers agricultural products at low prices.</p>	Consists of six regional offices located in the principal commercialized centers of Mexico. Also operates 1,700 grocery stores located in both rural and urban areas.
ANDSA	<p>Establishment of warehouses in principal demographic areas, in order to maintain stocks of agricultural products.</p> <p>Allocate capital resources to increase production and merchandising.</p>	Manages more than 800 warehouses with approximate capacity of 2.3 million metric tons. Coordinates efforts with BORUCONSA.
BORUCONSA	<p>Organize and promote the development of peasant production.</p> <p>Inform peasants of CONASUPO-guaranteed prices.</p> <p>Provide facilities for transporting peasant production.</p> <p>Distribute agricultural inputs such as fertilizer.</p>	Manages 1,700 warehouses with capacity of 2.0 million metric tons.
CECONCA	Assist peasants in different activities such as production process, application of fertilizers, water management, conservation and management of grain and seeds.	Provides educational programs in CECONCA centers to promote rural development.
PROMOTORA	Influence integration of peasants into new potential areas of production.	Provides technical assistance as well as infrastructure. Coordinates programs with the National Rural Credit Bank and SARH.
ICONSA	<p>Processing of agricultural products such as vegetable oil, corn flour, wheat flour, feed grains.</p> <p>Preserve and distribute these products for domestic consumption and export.</p> <p>Develop more diversified products for low-income consumers.</p>	Consists of several production plants and five regional sales agencies. Coordinates with DICONSA, ANDSA, and other Government-related agencies.
LICONSA	Regulate and modernize the milk product market, and increase both production and consumption by low-income families.	Consists of two production plants that process approximately 1 million liters of milk per day. Operates about 800 distribution points.
MICONSA	Regulate and modernize the products derived from corn.	Consists of five plants. Coordinates with DICONSA, ANDSA, and ICONSA.
TRICONSA	Provide different wheat products to low-income consumers at low prices.	Operates principally in Mexico City since practically all its production is consumed by Mexico City's population.

Source: [18].

essential for development of the areas, may enter duty-free. In 1971, the Government designated as free zones the States of Baja California Norte, Baja California Sur, Quintana Roo, Northwest Sonora, and the "Frontera" or border region. The "Frontera" includes areas within 20 kilometers of the Mexico-U.S. and Mexico-Guatemala borders.

Numerous food and agricultural products prohibited in the interior of Mexico are allowed to enter the free zones under a quota system (See "Constraints to Trade," which follows.) These imports usually enter duty-free or with only partial payment of duties. An import permit, which takes 4-6 weeks to obtain, is generally required. The product lists and quotas will vary within each region due to differences in population, product requests, local production, and domestic supply and demand factors.

Population growth and higher wages have significantly boosted consumption of food products in the border urban areas. The United States exported \$350 million of agricultural products to Mexico's free zones in 1982 until the peso devaluation provoked a steep decline in Mexican purchasing power. Current agricultural policy discourages agricultural imports into the free zones and allows only imports of food and agricultural products that are absolutely essential. The scarcity of dollars, especially dollars exchanged at the preferential rate, is also a detriment to agricultural exports into the free zones.

However, should Mexico successfully resolve its financial crisis, the border areas are expected to emerge again as strong markets for certain agricultural products because of

their large and growing population and well-established marketing channels. But whether the volume of numerous food and agricultural items customarily imported into the free zones—products like fresh meats, canned goods, lard, and alfalfa—will continue to grow depends upon the Government's development plans for the free zones.

### Constraints to Trade

The Mexican Government controls trade through a system of licenses, tariffs, and duties, the former being the most effective control on trade. A potentially important nontariff barrier could evolve because the domestic transportation system was not originally designed to facilitate foreign trade.

### Import Regulations

Permits or licenses are required for virtually all nonbasic agricultural and livestock imports. All applications for import licenses must be filed by the Mexican importer with SECOFIN. SECOFIN bases its decision to grant import requests on opinions from various SARH agencies such as DGEA, Directorate General for Plant Sanitation, National Commission for Fruit Promotion, National Seed Production Corporation, National Plant and Seed Varietal Certification Committee, and others, depending on the nature of each petition. Most of the quality standards and packaging requirements in force for food and agricultural products are drawn from USDA requirements. For some products, phytosanitary certificates or health tests are required. (Additional trade barriers facing U.S. exporters were detailed earlier in the "Trade Policies" section.)

Table 49—CONASUPO purchases of domestic grain and oilseed supplies

Year	Beans 1/	Maize 1/	Sorghum	Wheat	Soybeans	Rice
<u>Percent</u>						
1970	5.0	15.0	3.9	40.7	—	1.9
1975	19.4	24.8	13.3	36.8	33.6	10.2
1980	28.8	26.2	32.8	55.0	6.0	28.2

— = negligible.

1/ These figures would be higher if adjusted to reflect production withheld from the market by farmers for household use.

Source: [63].

Before granting an import permit, the Mexican Government consults domestic producers of the same or similar products. The perception of what products compete with domestic production is generally quite liberal. A request for an import permit will often be rejected if the product in question is only remotely similar to a domestically produced one. SECOFIN also consults with CONASUPO to decide whether, by whom, and in what quantity basic commodities should be imported. With livestock and livestock products, SECOFIN requests an opinion from the Undersecretary of Livestock, the Mexican National Cattlemen's Confederation, Directorate General of Livestock, Directorate General of Animal Sanitation, and DGEA [31].

### Transportation

Mexico has one of the most comprehensive transportation systems of any country in Latin America. The railroads and highways form a network linking all economically important areas to the major seaports, and connect with the United States at 12 border cities. Nonetheless, Mexico's transportation infrastructure is inadequate to handle the large trade flows of recent years (petroleum and gas exports; food and machinery imports).

Congestion on Mexico's rail lines extends to the U.S. border, where carloads of imported supplies and materials face delays as long as 2 weeks or more. This problem is due, in part, to the fact that Mexico's railroad system was not built to facilitate foreign trade, but for easy control of border traffic. So the single lines laid at all border crossings are now unable to handle the trade traffic between the United States and Mexico. In addition, outdated unloading facilities delay the turnaround of supply trains.

Mexico has more than 50 ports, 5 of which are free ports. Congestion here is also a major problem and trade must be staggered to prevent bottlenecks in the limited port facilities. Although there are 36 deep water ports, none has a good harbor, and dredging is seldom adequate. Eighty percent of total tonnage is handled by only five ports: Tampico, Veracruz, Guayamas, Mazatlan, and Manzanillo (see map). Other factors contributing to bottlenecks at the ports are

the increasing volume of Mexican exports, particularly petroleum products; the lack of cargo-handling facilities; poor coordination of financial management; and administrative bureaucracy.

Mexico's inadequate transportation system caused major bottlenecks in the flow of food imports in 1980. More than 45,000 U.S. and Canadian railcars were stranded in Mexico at one point in 1980. A special cooperative effort between Mexican and U.S. governments was necessary to untangle the snarl. The present system, if not improved, will continue to limit trade volume.

### CONCLUSIONS

Mexican market access strategies in the eighties will have to be flexible and innovative if the U.S. share of Mexico's agricultural import market is to grow and expand. While the de la Madrid administration may be relatively more favorable to trade liberalization, the United States must realize that any gains made in the Mexican market will carry associated costs. Mexico continues to object to restrictions on its agricultural exports to the United States. In turn, Mexico will expect the United States to moderate perceived trade restrictions if it expects greater access to the Mexican market.

In addition to continued USDA support of cooperator activities, other avenues to consider include:

- *Government-to-government supply agreements.* Mexico traditionally has favored this type of purchasing agreement. Recent grain purchase agreements with Brazil, Argentina, and Canada reflect this preference, as well as a desire to diversify suppliers.
- *Mexican and U.S. cooperative purchasing arrangements.* Some Mexican officials have expressed dissatisfaction with Mexico's current method of purchasing by public tender. Over the past few years, Mexico has indicated an interest in developing more formalized purchasing arrangements with U.S. grain cooperatives.
- *Use of GSM-301.* To promote greater import volumes of U.S. grains, the United

States could help finance storage in nonproducing regions along the border for use as transportation and distribution points during periods of exceptionally high demand. Assistance could also be provided with respect to barge grain handling. Barge transportation could both reduce total import costs as well as provide delivery opportunities in other, more shallow draft port areas. Bulk storage construction at strategic points would also have to be undertaken in order to ensure the return of U.S. barges.

- *Barter deals.* Although both countries are against this type of arrangement at present, a grains-for-petroleum barter arrangement may sometime appear more lucrative.
- *USDA's GSM-102 program.* The GSM-102 program, under which the U.S. Government guarantees loans provided to Mexican agricultural importers, will no doubt remain an effective tool for maintaining the large U.S. share of the Mexican basic commodities market in the near future.

The gap between production and consumption of most basic commodities will probably widen over the next decade, and the United States will retain its position as Mexico's principal source for food imports. Mexico's imports of basic commodities will likely continue to fluctuate as they did in the seventies, but the absolute size of the fluctuations will likely be greater. Based upon this expectation, it might prove more fruitful for the United States to focus on the logistics of moving needed commodities quickly and cheaply between countries. With respect to nonbulk commodities, export opportunities will no doubt exist over the next decade. However, U.S. traders and policymakers will have to be alert to these possibilities as they occur and flexible and innovative enough to ensure that U.S. producers are able to take advantage of changing situations.

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## APPENDIX: PROJECTION ASSUMPTIONS AND METHODOLOGY

### Food Consumption

The first iteration of projected consumption levels for 1982-92 in Mexico incorporated population growth, real disposable income growth, and income elasticities as the principal indicators of the growth in demand for human consumption of 10 commodities. Disposable income is projected to increase at a slower pace than in the seventies, contracting until 1984 before expanding by 1.0-3.7 percent annually throughout the remainder of the projection period. Population growth is expected to slow as well, from the 3.6 percent that prevailed last decade to an average annual rate of 2.5 percent (app. table 1).

In some cases, the above methodology yielded unlikely results. Probable policy changes were then estimated in a second iteration in terms of price parameters, and the effect was introduced into the demand formula. For example, beef consumption in the first iteration would have exceeded estimated domestic supplies by 170,000 tons by 1992, a highly unlikely scenario given expected world supplies and prices a decade hence. Using the price elasticity for beef, the second iteration estimated what necessary effect on prices that Mexican policy--whether in the form of regulation of beef imports or another type of

intervention in the market--must have in order to subdue consumption to a level where domestic supplies and an affordable volume of imports could satisfy it (app. table 2). In this manner, it was not necessary to predict the precise tool (or combination of tools) that Mexican policymakers would employ over the next decade.

### Feed Consumption

Feed grain and protein meal requirements were forecast by using estimates of future meat, milk, and egg production in Mexico together with assumptions about the future growth in the percentage of the production of livestock commodities using modern feeding technology and product/feed conversion ratios (app. table 3). Total grain requirements were then translated into requirements for individual grains (corn, wheat, and sorghum) by use of ratios that prevailed in the base period. All demand projections for oilmeals were calculated in 44-percent soymeal equivalents instead of estimates of the demand for each individual oilseed.

### Production

Production projections for the five livestock commodities included in this study were made by extrapolating past trends (including cycles) in herd sizes and slaughter and extraction rates. Area and yield projections for the four grains, one pulse, and six oilseeds included in

**Appendix table 1--Macroeconomic assumptions used in the projections**

Year	Gross domestic product		Real per capita disposable income		Population	
	1970 pesos		1970 pesos		Number	
	Billion	Percent	Billion	Percent	Thousands	Percent
1980	841.9	8.3	10,670	5.9	67,796	3.0
1981	908.8	7.9	11,141	4.4	69,762	2.9
1982	903.8	.5	10,888	-2.3	71,715	2.8
1983	856.2	-5.3	9,981	-8.4	73,652	2.7
1984	854.5	-.2	9,497	-4.9	75,567	2.6
1985	885.2	3.6	9,663	1.8	77,456	2.5
1986	926.9	4.7	9,985	3.3	79,392	2.5
1987	977.8	5.5	10,214	2.3	81,298	2.4
1988	1,031.6	5.5	10,591	3.7	83,168	2.3
1989	1,076.0	4.3	10,785	1.8	85,080	2.3
1990	1,135.2	5.5	11,180	3.7	87,037	2.3
1991	1,189.6	4.8	11,447	2.4	88,952	2.2
1992	1,249.1	5.0	11,788	3.0	90,909	2.2

Source: [16].

this report were made using exponential time trends as guidelines. The resulting oilseed production projections were then converted into meal and oil by use of historical crushing and extraction rates. At this point, projected fishmeal production was added to the oilseed meal total. The meals were then converted into 44-percent soymeal equivalents in order to account for the different protein levels of each meal. Finally, the pasture requirements for cattle and the area for annual crops that underpin the supply projections were checked against estimates of total arable land in Mexico, and were found to be well within these bounds, allowing substantial area for the other annual and perennial crops not included in this study.

Appendix table 2—Parameters used for projecting human consumption

Commodity	Income elasticity	Own price elasticity	Projected annual real change in prices
	Percent		
Beef	0.951	-0.680	3.0
Pork	.848	-.647	2.5
Poultry	.945	-.437	0
Milk	.650	-.294	.5
Eggs	.686	-.493	2.0
Corn	-.300	-.454	1.0
Dry beans	.230	-.162	0
Wheat	.400	-.393	0
Rice	.300	-.198	0
Vegetable oil	.705	-.264	0

Sources: [5, 17, 23, and author's estimates].

Appendix table 3—Assumptions underlying feed grain and protein meal consumption projections

Commodity	Percent of commodity fed	Grain/product ratio	Protein meal/product ratio
	Percent	Ratio	Ratio
1979-81 avg:			
Beef	7	6.20	2.25
Pork 1 1/	15	5.50	1.00
1 1/	45	6.50	.60
Poultry	100	2.45	1.00
Milk	55	.37	.06
Eggs	97	2.75	1.00
1987:			
Beef	7	6.20	2.25
Pork 1 1/	25	5.50	1.00
1 1/	45	6.50	.60
Poultry	100	2.45	1.00
Milk	55	.37	.06
Eggs	97	2.75	1.00
1992:			
Beef	7	6.20	2.25
Pork 1 1/	35	5.50	1.00
1 1/	45	6.50	.60
Poultry	100	2.45	1.00
Milk	55	.37	.06
Eggs	97	2.75	1.00

1/ Semi-technical (1) and technical (11) production systems. See the "Agricultural Sector-Livestock Production" section for definitions.

Appendix table 4--Mexico's agricultural imports and the U.S share, 1969-82

Commodities	1969	1970	1971	1972	1973	1974	1975
<u>1,000 dollars</u>							
Live animals U.S.	11,156 9,502	9,872 7,632	12,328 10,318	15,227 11,746	24,830 20,230	35,998 33,273	37,813 36,214
Meat & preparations U.S.	5,130 4,782	6,110 5,736	5,092 4,483	5,061 4,166	9,349 8,630	16,457 16,049	18,031 15,354
Dairy prod. & eggs U.S.	14,595 7,535	24,709 8,101	36,100 10,279	48,231 20,990	50,221 8,647	104,510 10,269	47,873 16,225
Cereals & preparations U.S.	8,559 7,493	42,577 38,557	19,432 18,774	73,583 72,786	166,788 166,640	488,154 467,349	474,297 330,445
Fruits U.S.	8,184 5,814	7,292 5,893	7,861 5,802	5,974 4,616	7,447 5,787	10,926 8,046	13,348 11,308
Vegetables U.S.	5,053 4,829	8,266 7,660	5,425 5,149	4,337 4,065	6,341 5,890	38,479 37,227	65,013 38,073
Sugar & preparations U.S.	2,297 1,578	1,989 1,399	2,176 1,643	2,148 1,659	3,236 2,086	3,582 2,916	3,064 2,028
Coffee, tea, spices, cocoa U.S.	4,560 858	3,418 883	4,132 647	4,482 897	2,223 1,185	6,791 2,009	4,931 2,116
Feedstuffs U.S.	11,629 3,923	18,704 5,032	34,773 17,579	22,097 10,488	19,238 13,500	38,337 24,808	28,259 14,909
Fats, shortenings, & misc. U.S.	9,439 9,077	11,787 11,505	8,181 7,688	8,475 7,942	13,772 13,269	22,637 20,983	23,350 22,674
Beverages & tobacco U.S.	5,393 2,218	5,923 2,598	12,917 2,902	17,097 4,422	25,456 7,710	27,920 9,044	27,544 6,550
Hides & skins U.S.	15,999 15,942	18,162 18,065	18,724 18,598	25,314 25,058	36,552 36,159	36,880 36,691	27,814 27,396
Oilseeds U.S.	4,510 3,611	19,597 17,136	10,166 10,130	3,595 3,561	38,848 34,640	109,400 95,719	8,831 8,661
Rubber, gums U.S.	11,716 70	9,728 112	8,836 34	7,836 121	18,337 75	25,811 608	22,439 660
Textile fibers U.S.	19,027 1,255	14,532 1,402	12,237 1,636	10,636 1,874	12,399 2,376	17,458 3,749	14,251 3,624
Animal & veg. mat. U.S.	9,081 7,502	10,485 8,254	12,404 9,714	12,530 9,338	18,244 14,251	27,359 20,446	21,181 17,220
Animal fats, veg. oils U.S.	9,016 7,315	19,573 17,056	7,074 5,018	5,071 2,090	36,306 27,296	90,501 81,833	40,204 36,994

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Appendix table 4--Mexico's agricultural imports and the U.S share, 1969-82--Continued

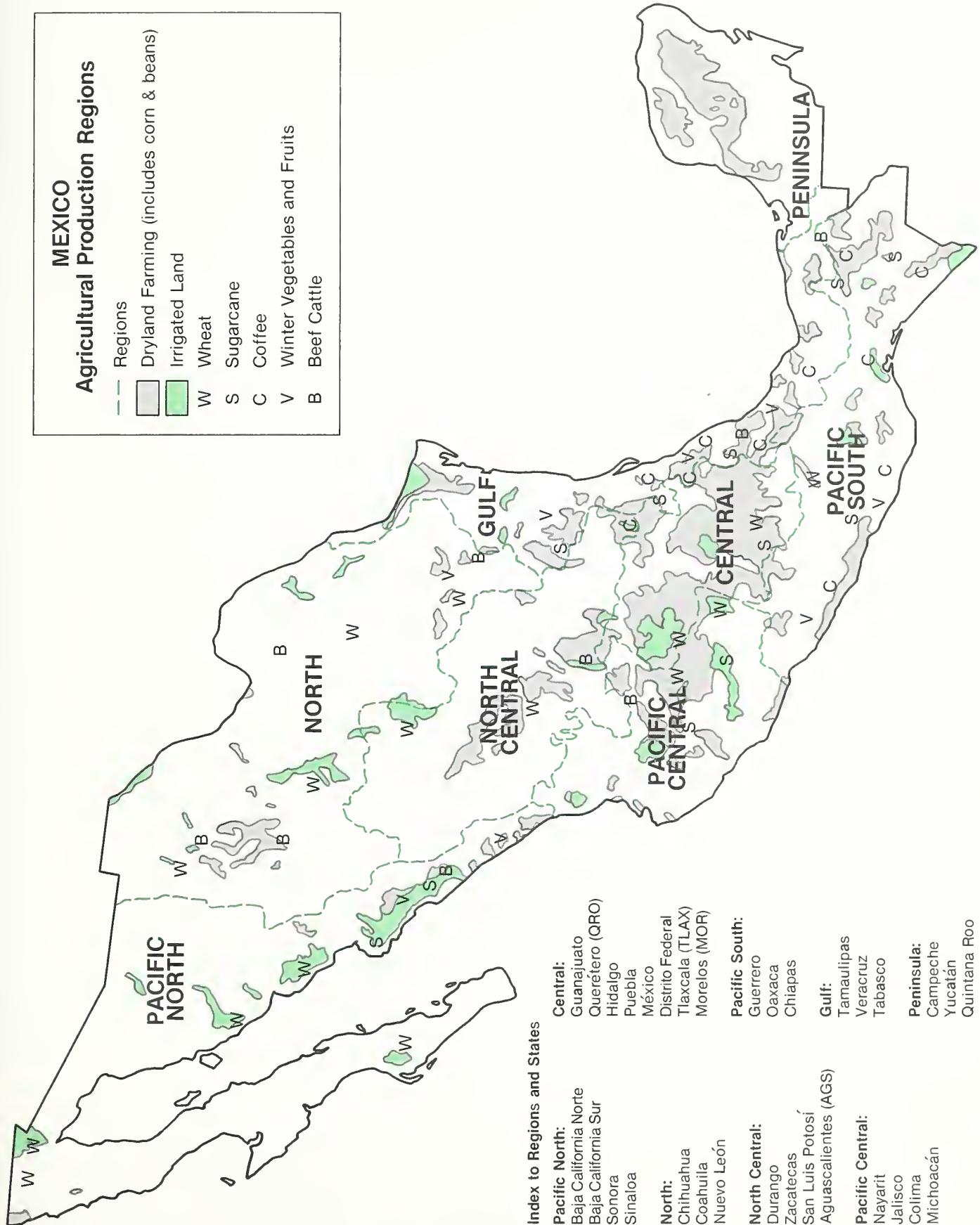
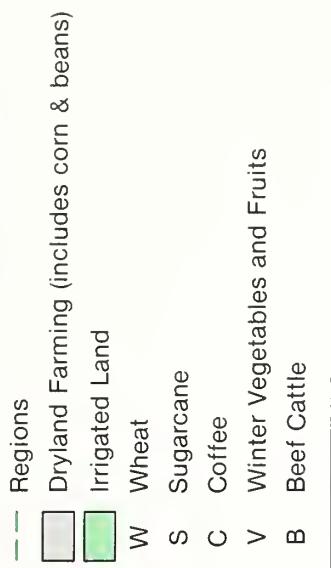
Commodities	1976	1977	1978	1979	1980	1981	1982
<u>1,000 dollars</u>							
Live animals U.S.	39,996 36,808	21,631 19,594	29,532 22,013	38,134 29,405	33,411 23,462	68,414 44,712	49,090 41,980
Meat & preparations U.S.	21,531 18,324	16,941 16,583	26,581 24,756	42,377 38,069	56,638 52,167	86,529 64,106	53,896 46,555
Dairy prod. & eggs U.S.	52,213 16,538	63,581 11,621	72,634 21,489	85,870 27,681	243,860 73,382	297,378 90,181	173,127 61,412
Cereals & preparations U.S.	106,563 96,177	313,401 294,016	373,309 344,127	495,306 492,544	1,244,614 1,207,887	1,155,151 1,038,742	350,364 300,516
Fruits U.S.	11,048 9,192	10,680 9,174	13,432 9,946	18,206 14,573	23,127 18,743	50,434 42,813	14,867 12,296
Vegetables U.S.	8,714 8,416	8,181 7,380	13,819 12,515	22,497 20,918	240,003 237,845	360,565 355,286	113,565 111,971
Sugar & preparations U.S.	2,581 2,408	2,285 2,251	4,656 3,916	6,935 6,263	185,663 143,585	217,260 160,834	102,874 8,479
Coffee, tea, spices, cocoa U.S.	7,361 2,742	6,819 2,712	9,011 1,979	5,627 2,774	10,068 3,367	22,321 5,032	11,505 2,919
Feedstuffs U.S.	17,246 9,682	69,259 65,212	34,673 32,594	58,687 56,445	102,995 100,065	76,770 73,261	27,590 23,193
Fats, shortenings, & misc. U.S.	23,550 22,922	28,061 25,799	26,630 25,783	31,227 29,858	32,233 28,910	41,359 36,773	36,962 35,379
Beverages & tobacco U.S.	28,526 8,059	27,662 9,337	34,903 12,722	46,257 3,993	73,786 2,630	79,956 3,913	27,879 2,678
Hides & skins U.S.	30,579 30,563	37,786 37,214	55,746 54,832	102,719 102,124	70,725 69,860	87,435 84,546	65,027 64,276
Oilseeds U.S.	101,810 70,063	159,597 115,820	302,429 268,077	124,947 124,761	405,852 386,221	476,640 325,729	356,543 285,709
Rubber, gums U.S.	30,397 184	29,801 167	30,387 585	1,035 1,035	53,713 2,339	54,293 1,126	31,138 945
Textile fibers U.S.	12,429 1,735	13,753 1,883	23,433 8,440	23,186 9,009	25,176 6,842	38,802 5,164	24,082 5,063
Animal & veg. mat. U.S.	27,097 22,219	26,333 21,185	24,596 19,230	34,982 23,378	48,812 36,062	62,616 48,508	38,711 32,285
Animal fats, veg. oils U.S.	20,580 14,746	35,933 30,700	57,815 47,737	48,027 43,500	99,894 95,380	53,578 49,076	121,099 114,267

Source: [66].



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